SOILS & SURFACE WATER

Testimony of Marylou Taylor, P.E.

SUMMARY OF CONCLUSIONS

This assessment analyzes the potential impacts on soil and surface water resources by the proposed Hidden Hills Solar Electric Generating System (HHSEGS). Refer to the **WATER SUPPLY** section of this Final Staff Assessment for a detailed analysis of the potential impacts on groundwater supplies and groundwater quality.

California Energy Commission (Energy Commission) staff evaluated the potential impacts to: accelerated wind or water erosion and sedimentation; flood conditions in the vicinity of the project; surface water supplies; surface water quality; and compliance with all applicable laws, ordinances, regulations, standards (LORS) and state policies. Staff concludes that construction and operation of the proposed HHSEGS project would not result in any significant adverse impacts to soil and surface water resources, and would comply with applicable LORS and state policies, provided that the measures proposed in the Application for Certification (AFC) and staff's proposed conditions of certification are implemented.

The proposed HHSEGS project would not impede or significantly redirect flood flows of the designated 100-year floodplain. Compliance with staff proposed Conditions of Certification **SOILS-1** through **-9** would reduce or avoid impacts to less than significant of soil erosion, contact runoff, and discharge wastewater during construction and operations. Condition of Certification **SOILS-5** would reduce potential impacts from storm water damage. Condition of Certification **SOILS-6** would reduce potential offsite flooding impacts to Old Spanish Trail Highway/Tecopa Road.

Staff has not identified any significant impacts that would occur in Nevada regarding water quality and hydrology caused by the proposed HHSEGS project. The water quality and hydrology impacts from the linear facilities (transmission line and natural gas line portions) within the state of Nevada would be assessed by the Bureau of Land Management.

INTRODUCTION

This section of the Final Staff Assessment (**FSA**) analyzes the potential effects on soil and surface water resources by the proposed HHSEGS. This assessment specifically analyzes surface hydrology, surface water quality, and soil erosion by focusing on the potential for HHSEGS to:

- cause accelerated wind or water erosion and sedimentation;
- exacerbate flood conditions in the vicinity of the project;
- adversely affect surface water supplies;
- degrade surface water quality; and,

- comply with all applicable laws, ordinances, regulations and standards (LORS) and state policies.

Refer to the **WATER SUPPLY** section of this **FSA** for a detailed analysis of the potential effects on groundwater supplies and groundwater quality.

Where the potential for impacts is identified, staff proposes mitigation measures to reduce the significance of the impact and, as appropriate, recommends conditions of certification to ensure that any impacts are less than significant and the project complies with all applicable LORS.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Soils & Surface Water Table 1
Laws, Ordinances, Regulations, and Standards (LORS) and Policies

Federal LORS	
Clean Water Act (33 U.S.C. Section 1257 et seq.)	The Clean Water Act (CWA) (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of storm water and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act.
State LORS	
The Porter-Cologne Water Quality Control Act of 1967, California Water Code Section 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs) to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue waste discharge requirements (WDRs) specifying conditions for protection of water quality as applicable. Section 13000 also requires the state to be prepared to exercise its full power and jurisdiction to protect the quality of the waters of the state from degradation. Although Water Code 13000 et seq. is applicable in its entirety, the following specific sections are included as examples of applicable sections.
California Water Code Section 13240, 13241, 13242, 13243, & Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the region. The Basin Plan describes implementation measures and other controls designed to ensure compliance with statewide plans and policies and provides comprehensive water quality planning.
California Water Code Section 13260	This section requires filing, with the appropriate RWQCB, a report of waste discharge that could affect the water quality of the state unless the requirement is waived pursuant to Water Code section 13269.
California Code of Regulations, Title 20, Division 2, Chapter 3, Article 1	The regulations under Quarterly Fuel and Energy Reports (QFER) require power plant owners to periodically submit specific data to the California Energy Commission, including water supply and water discharge information.
SWRCB Order 2009-0009-DWQ	The SWRCB regulates storm water discharges associated with construction affecting areas greater than or equal to 1 acre to protect state waters. Under Order 2009-0009-DWQ, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.

SWRCB Order 2003-0003-DWQ	The SWRCB regulates storm water discharges to land that has a low threat to water quality. Categories of low threat discharges include piping hydrostatic test water.
SWRCB Order 97-03-DWQ	The SWRCB regulates storm water discharges associated with several types of facilities, including steam electric generating facilities. Under Order 97-03-DWQ, the SWRCB has issued a NPDES General Permit for storm water discharges associated with industrial activity. Projects can qualify under this permit if specific criteria are met and an acceptable SWPPP is prepared and implemented after notifying the SWRCB with a Notice of Intent.
Local LORS	
Inyo County General Plan	The General Plan includes water resources related goals and implementation measures to protect water resources from overutilization, degradation, and export.
Inyo County Code Title 21, Ordinance No. 1158 (Renewable Energy Ordinance)	Requires developers of solar thermal, photovoltaic, or wind energy power plants to obtain a renewable energy permit before the project moves forward. Facilities exempt from a renewable energy permit are required to obtain a "renewable energy impact determination" from the county to ensure that mitigation measures are addressed and, to the extent possible, incorporated into any approval of the facility granted by the applicable state or federal agency.
State Policies and Guidance	
SWRCB Res. 68-16	The "Antidegradation Policy" mandates that: 1) existing high quality waters of the state are maintained until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial uses, and will not result in waste quality less than adopted policies; and 2) requires that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet WDRs which will result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance will not occur and b) the highest water quality consistent with maximum benefit to the people of the state will be maintained.
SWRCB Res. 2008-0030	This SWRCB resolution requires sustainable water resources management, such as low impact development (LID) and climate change considerations, in all future policies, guidelines, and regulatory actions. It directs Regional Water Boards to "aggressively promote measures such as recycled water, conservation and LID Best Management Practices where appropriate and work with Dischargers to ensure proposed compliance documents include appropriate, sustainable water management strategies."

SETTING

REGIONAL SETTING – PAHRUMP VALLEY

The HHSEGS project would be located in the Pahrump Valley in the eastern Mojave Desert. Pahrump Valley, contained in both California and Nevada at an elevation of roughly 2,700 feet above mean sea level, is bordered by mountain ranges and adjoining valleys (see **Soils & Surface Water Figure 1**). The Nopah Range and Kingston Range border Pahrump Valley to the west and southwest, respectively. The Spring Mountains, which border Pahrump valley to the east in Nevada, reach 11,910 feet above mean sea level. Stewart Valley and Mesquite Valley border Pahrump Valley to the northwest and southeast, respectively.

The Pahrump Valley region is mostly very gently to moderately sloping alluvial fans, nearly level basin floor, and dry lakebeds with large playas. Major surface water features within the Pahrump Valley include Stewart (dry) Lake (approximately six square miles) located in California in the northwest portion of the valley, Pahrump (dry) Lake (approximately ten square miles) located in the central part of the valley in Nevada, and ephemeral washes located throughout the valley. The surrounding watershed has two main watercourses, Stump Springs and Lovell Wash. Both watercourses originate in Nevada and converge south of the site where they flow into Pahrump Valley. Average annual precipitation ranges from about four to six inches, and surface runoff within the Pahrump Valley drains towards Stewart (dry) Lake in California or towards Pahrump (dry) Lake in Nevada (DWR 2004).

Numerous small desert washes (ephemeral drainages) from the Spring Mountains cross the state border from Nevada and into California in the project area. The slope gradient diminishes from east to west. Surface waters that enter the proposed project site occur only during heavy rains and storm water runoff eventually drains into Stewart (dry) Lake located northwest of the proposed project.

The primary responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards. The portion of Pahrump Valley located within California falls under the jurisdiction of Lahontan Regional Water Quality Control Board (Lahontan RWQCB). Residents, visitors and nature rely on the region's water resources to provide beneficial uses, defined as "uses of water necessary for the survival or well being of people, plants and wildlife." The Water Quality Control Plan for the Lahontan Region (Basin Plan) designates beneficial uses for water bodies within the region, and establishes water quality objectives and implementation plans to protect those beneficial uses.

The Pahrump Valley watershed is contained in both California and Nevada. Lahontan RWQCB identifies the portion of Pahrump Valley watershed located within California as the Pahrump Hydrologic Unit, which does not contain any perennial surface water bodies. The Basin Plan does, however, recognize "all minor surface waters" in the Pahrump Hydrologic Unit as resources. The beneficial use designations for minor surface waters, both existing and potential, are listed in **Soils & Surface Water Table 2**. The Basin Plan does not identify receiving water for the Pahrump Hydrologic Unit.

Soils & Surface Water Table 2
Lahontan RWQCB Basin Plan Beneficial Use Designation for Minor Surface Waters in the Pahrump Valley

Existing or Potential Beneficial Uses	Description
Rare, Threatened, or Endangered Species	Supports habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered
Wildlife Habitat	Supports terrestrial ecosystems or wildlife water and food sources
Warm Freshwater Habitat	Supports warm water ecosystems
Commercial and Sportfishing	For fish or other organisms including, but not limited to, those intended for human consumption
Water Contact Recreation[1]	Activities involving body contact with water where ingestion of water is reasonably possible (i.e. swimming, wading, fishing)
Non-contact Water Recreation[1]	Activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible (i.e. picnicking, hiking, camping, boating)
Ground Water Recharge	Natural or artificial recharge for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion
Agricultural Supply	Farming, horticulture, or ranching
Municipal and Domestic Supply[1]	Used for community, military, or individual water supply systems including, but not limited to, drinking water supply

(Source: RWQCB 2005)
Note 1: The Basin Plan designates this beneficial use for all surface waters of the Lahontan Region, including all surface waters located in the Pahrump hydrologic unit.

LOCAL SETTING – CHARLESTON VIEW AREA

Soil Features

The project site is located on private land, which has already been partially disturbed as part of a previously approved residential development. Although the residential development was never completed, unpaved roads were installed in a grid pattern, which remains to the present date. The remainder of the site is mostly bare soil with sparse natural vegetation, similar to the surrounding area (HHSG 2011a § 5.11.3). The rural residential subdivision community known as Charleston View, established in the 1960s with a current population of about 70 people, is located just south of the project site (J&S 2001).

The project site is situated on the downstream edge or margin of alluvial fans that emanate from the Spring Mountains, as shown on **Soils & Surface Water Figure 2**. Alluvial fans form at the base of topographic features where there is a marked break in slope. Water-transported material (alluvium) carried by a mountain stream enters a broad flat valley and deposits sediment as its velocity decreases on entering the flatter valley. This creates fan-shaped deposits. Consequently, alluvial fans tend to be coarse-grained, especially at their mouths. At their edges, however, they can be relatively fine-grained.

Detailed Natural Resources Conservation Service (NRCS) soil survey data is not available for the project site; therefore the applicant used U.S. General Soil Map information to estimate soils properties. The U.S. General Soil Map consists of general soil association units, created by generalizing more detailed soil survey maps. In situations such as the HHSEGS proposed site where more detailed soil survey maps are not available, data on geology, topography, vegetation, and climate were assembled, together with satellite images. Soils of like areas are studied, and the probable classification and extent of the soils were determined. The U.S. General Soil Map shows the entire HHSEGS site within a much larger area labeled with Soil Unit S5740, which is a particular grouping of several separate soil types that would likely be found together in a landscape. Subcomponents of Soil Unit S5740 are presented in **Soils & Surface Water Table 3**. Descriptions of the four Hydrologic Soil Groups, which classifies a soil's infiltration characteristics, are listed in **Soils & Surface Water Table 4**.

Soils & Surface Water Table 3
U.S. General Soil Map: Soil Unit S5740 Sub-Components

Sub-Components	Composition percent	Hydrologic Group	Texture
Beshem	25	C	Clay / Clay loam
Nopah	15	C	Loam
Glencarb	10	C	Silt loam
Haymont	10	B	Very fine sandy loam
Rumpah	10	D	Clay
Tencee	10	D	Gravelly loam
Bluepoint	5	A	Loamy fine sand
Pahrump	5	C	Fine sandy loam
Tanazza	5	B	Fine sandy loam
Wodavar	5	D	Fine sandy loam

(Source: HHSG 2011b, Attach 5.15ER)

Note: This percent composition generally applies to the entire generalized soil association, which is extremely large. The HHSEGS site may contain only a few of these series.

Soils & Surface Water Table 4
Hydrologic Soil Groups

Hydrologic Soil Group	Description
A	Low runoff potential. Soils having high infiltration rates (greater than 0.30 inches per hour) even when thoroughly wetted and consisting chiefly of deep, well-drained sands or gravels.
B	Soils having moderate infiltration rates (0.15 – 0.30 inches per hour) when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well- to well-drained sandy loam soils with moderately fine to moderately coarse textures.

Hydrologic Soil Group	Description
C	Soils having slow infiltration rates (0.05 – 0.15 inches per hour) when thoroughly wetted and consisting chiefly of silty-loam soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture.
D	High runoff potential. Soils having very slow infiltration rates (0 – 0.05 inches per hour) when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material.

The applicant also completed onsite investigations to collect data on soil characteristics specific to the site. A Preliminary Geotechnical Evaluation was prepared following subsurface exploration performed in January 2011. Results from laboratory testing showed that the shallow surface deposits consist of a porous, sandy surface layer overlying a hardpan layer (HHSG 2011a, App 5.4A). An infiltration and drain time analysis was prepared following infiltration rate testing during July 2012 at onsite locations near the western border[1]. The composite infiltration rate was calculated at about 0.8 inches per hour (CH2 2012ii), which corresponds to Hydrologic Soil Group A. Although this value is based on soils located near the western project site border, it suggests that infiltration rates for the entire site could be higher than the infiltration characteristics suggested in **Soils & Surface Water Table 3**.

Surface Water Features

Numerous small desert washes (ephemeral drainages) from the Spring Mountains cross the state border from Nevada and into California in the project area. The slope gradient diminishes from east to west. Surface waters that enter the proposed project site occur only during heavy rains and dissipate quickly into the well-drained, sandy surface soils.

Features of the drainages include single, large channels with well-defined bed and banks, as well as broad, but sometimes weakly expressed, assemblages of shallow braided ephemeral channels. Many of the washes interconnect with other nearby washes either by natural forces or by following the grid of existing dirt roadways on the project area which interfere with the natural hydrology. Water runoff generally drains toward the west via sheet flow and these natural drainage channels, draining to the northwest and eventually into Stewart (dry) Lake located northwest of the project (HHSG 2011a, App 5.15C).

A total of 80 ephemeral washes were mapped in the project area by the applicant and identified as potential “Waters of the State” (CH2 2012k). The Lahontan RWQCB and California Department of Fish and Game (CDFG) are currently reviewing the project to determine whether any of the onsite washes are “Waters of the State”. The Lahontan

[1] The purpose of the analysis was to develop representative infiltration rates for soils in the planned storm water retention area located at the western border of the site. For further information about the proposed retention area, see “Onsite Area Flooding” discussion below under “Direct Impacts”.

RWQCB will verify the extent of jurisdictional Waters of the State on the site, and CDFG and the Energy Commission will verify which of these features will be subject to streambed alteration requirements under Section 1600 of the Fish and Game Code. Two of the ephemeral washes were determined to be "Waters of the U.S." by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act (CH2 2012k), as shown on **Soils & Surface Water Figure 2**. For further discussion on the jurisdictional determination, please refer to the **BIOLOGICAL RESOURCES** section of this **FSA**.

Area Flooding

The Federal Emergency Management Agency (FEMA) prepares 100-year flood maps for flood insurance purposes and for floodplain management use by local agencies to reduce the impact of flooding. FEMA map panels 06027C-4625D and 06027C-4175D cover the entire project site and show that the project site crosses into the Zone A[2] boundary in two areas: one located at the north tip of the site and the other located at the southwest corner of the site (see **Soils & Surface Water Figure 3**). Because FEMA does not indicate a value for expected flood depth for this floodplain boundary, the relative risk of flood damage (i.e. one foot of water versus three feet of water) is less predictable than floodplains where base flood elevation is determined.

The applicant completed a more detailed analysis of the project site and surrounding area. A Preconstruction Hydrology Analysis was submitted with the AFC that modeled offsite peak flows, runoff volumes, maximum velocities and maximum depths of potential floods (HHSG 2011a, App 5.15C). As shown on **Soils & Surface Water Figure 3**, the FEMA Zone A boundary (depicted by a heavy black outline) similarly matches areas where flooding of up to three feet deep were modeled (depicted by purple-colored cells). The exception occurs southeast of the project, where depths up to three feet appear just outside the Zone A boundary. This is runoff that originates as far away as the Spring Mountains in Nevada and flows through the Stump Springs area before dissipating at the valley floor (depicted by the fan shape). A portion of this flow is shown to enter the project site at its southeast corner, as well as a section of the southern boundary.

The fact that Old Spanish Trail Highway (also called Tecopa Road) borders the project site's southern boundary implies that the roadway also experiences flooding caused by large storm events. Posted signs along the roadway caution motorists of potential flooding, and residents of Charleston View have indicated during workshops and PSA comments that flooding of the roadway occurs[3]. The extent, depths, or locations of the flooding is not well documented because Inyo County does not keep specific storm related data (CEC 2012ii). Inyo County's Road Department records the days a flood event occurred and whether road repairs were made to fix flood damage, but logs do not indicate what portion of Tecopa Road was impacted by the noted event.

[2] Zone A is defined by FEMA as special flood hazard area subject to inundation by the 1% annual chance flood also known as the 100-year flood (the flood that has a 1% chance of being equaled or exceeded in any given year). Because detailed analyses are not performed for Zone A, no depths or base flood elevations are shown within these zones. See www.fema.gov.

[3] Including but not limited to, PSA Workshop 1 (June 14, 2012 in Pahrump, Nevada) and Supplemental Comments & Analysis submitted by intervenor C.R. MacDonald (MAC 2012c).

Topographic maps show that the low point of Tecopa Road is located roughly 4,000 feet west of the HHSEGS site, which also falls within the published FEMA Zone A boundary.

The applicant's preconstruction hydrology study shows that the portion of Tecopa Road located directly adjacent to the project site is expected to flood from flows traveling northwest from the Stump Springs area and across the roadway. Floods of approximately one foot deep in spot locations are expected from rainfall equal to or larger than a 5-year, 24-hour storm, but no flooding is expected from a 2-year, 24-hour storm[4]. It is important to note that these rainfall recurrence intervals apply to rainfall that occurs in contributing sub-basins located upstream (primarily through the Stump Springs area), which eventually combine at Tecopa Road to cause flooding before they reach the southern and eastern site boundary. See **Soils & Surface Water Figure 4** for locations of the contributing sub-basins. Based on topographic maps, no storm water runoff from the proposed site location currently flows onto Tecopa Road.

Existing Project Site Flooding

The applicant's Preconstruction Hydrology Analysis (HHSG 2011a, App 5.15C) also modeled onsite peak flows, runoff volumes, maximum velocities, and maximum depths of potential floods. Results of the onsite flow modeling verify that storm water flows across the proposed site from the east toward the west. Estimated flows due to a 100-year storm show that the majority of runoff originating offsite would enter the site through the southern solar plant before leaving the site at its western boundary. **Soils & Surface Water Table 5** presents the estimated peak flows leaving the site calculated from cross-sections located along the west border (as shown in **Soils & Surface Water Figure 5**). Because cross sections are different widths, the table calculates the average flow per foot across each cross section.

Soils & Surface Water Table 5
Estimated Preconstruction Peak Discharge along Western Boundary

Floodplain Cross Section		Rain Event					
		100-year storm		25-year storm		10-year storm	
No.	Approx. Width	Peak Flow	Flow per foot	Peak Flow	Flow per foot	Peak Flow	Flow per foot
CS-4	2500 ft	778 cfs	0.31	516 cfs	0.21	314 cfs	0.13
CS-5	4700 ft	252 cfs	0.05	111 cfs	0.02	52 cfs	0.01
CS-6	4200 ft	5590 cfs	1.33	2578 cfs	0.61	1227 cfs	0.29
CS-7	3900 ft	5241 cfs	1.34	1977 cfs	0.51	941 cfs	0.24
Flows through the Stump Springs area (estimated, for comparison only):							
	900 ft	15900 cfs	17.67	7400 cfs	8.22	3800 cfs	4.22

(Source: HHSG 2011a, App 5.15C)
Notes: Refer to **Soils & Surface Water Figure 5** for locations of Floodplain Cross Sections.
cfs – cubic feet per second
Flow per foot units are cfs per foot.

[4] The "recurrence interval" is based on the probability that the given event will be equaled or exceeded in any given year. A 5-year storm has a 20 percent chance of occurring in any given year, and a 2-year storm has a 50 percent chance of occurring in any given year. Rainfall recurrence intervals are based on both the magnitude and the duration of a rainfall event. For example, a 5-year, 24-hour storm is the amount of rainfall with a 20 percent chance of occurring in a certain area in a 24-hour period during any given year. Generally speaking, a larger recurrence interval would result in a larger storm.

When comparing flows at different cross sections for the same rain event, rates across the bottom half of the site are much higher than the top half. Comparing cross sections for different rain events, the north end of the site experiences peak flows during the large 100-year storm at about the same rate (0.3 cfs per foot) as the southern portion of the site during a much smaller 10-year storm. Staff included rough flow estimates occurring through the Stump Springs area during each storm even to give perspective of scale. Estimates show the flow from the Stump Springs drainage area is about 3 times greater than any of the events for each of the flow segments on the site.

Groundwater Resources

For a detailed discussion of the regional and local groundwater resources, refer to the **WATER SUPPLY** section of this **FSA**.

PROJECT DESCRIPTION

Hidden Hills Solar I, LLC, and Hidden Hills Solar II, LLC (the applicant) proposes to construct the Hidden Hills Solar Electric Generating System (HHSEGS), located on approximately 3,097 acres in Inyo County, California, adjacent to the Nevada border. HHSEGS would comprise two solar fields with heliostat arrays and associated facilities: the northern solar plant (Solar Plant 1) and the southern solar plant (Solar Plant 2). Each solar plant would generate 270 megawatts (MW) gross (250 MW net), for a total net output of 500 MW.

Major items at each solar plant would include a steam turbine system, an air-cooled steam condenser system, and a 750-foot-tall solar power tower topped with a solar receiver steam generator (SRSG). A 103-acre common area located at the southeastern corner of the HHSEGS site would include an administration, warehouse, and maintenance complex; an onsite 138 kV substation; a natural gas metering station; and a parking area for visitors and employees. Temporary construction laydown and parking areas would be located in three locations, one on the west side of the site occupying approximately 180 acres and one within each solar field near the respective Solar Plant occupying approximately 8.5 acres each (HHSG 2011a, App 5.15A). The 180-acre temporary construction laydown area in addition to the entire HHSEGS site would total 3,277 acres. The perimeter of the site would be surrounded by desert tortoise fencing backed by a chain link security fence, There would also be landscaping such as trees and shrubs oriented parallel to and adjacent to the fencing.

Refer to the **PROJECT DESCRIPTION** section of this **FSA** for more information on HHSEGS major features including water use, wastewater discharge, and storm water handling. Additional information relevant to the soil and water resources analysis is summarized below. For a complete detailed description of the proposed project, refer to the HHSEGS Application for Certification ([AFC] HHSG 2011a) and the applicant's related supplemental material.

PROJECT CONSTRUCTION

Construction of HHSEGS is expected to take place from the second quarter of 2013 to the fourth quarter of 2015, for a total of 29 months.

Soil Erosion and Storm Water Control

During construction, portions of the project site would be graded, including portions along the ephemeral washes. Grading is not intended to level the site, but rather to prepare the site for installation of the heliostats and ease future maintenance activities. As such, the existing depressions for the drainages would remain, and natural drainage waters are expected to continue to flow in and through these ephemeral washes. Any grading required would be designed to promote sheet flow where possible (HHSG 2011a, App 5.15C).

Power Plant Sites

Major items at each solar plant would include a steam turbine system, an air-cooled steam condenser system, and a 750-foot-tall solar power tower topped with a SRSG. Other associated items include various raw water/wastewater treatment facilities with water storage tanks, auxiliary boilers, mirror washing related equipment, and a plant services building with parking. Heavy to medium grading would be performed within each plant's solar power tower and power block areas. The earthwork within the power blocks would be excavated and compacted to the recommendations of the final geotechnical report. The deepest excavations would occur for foundations and sumps (HHSG 2011a §§ 2.4.1.1, 5.11.4.6.2).

Prior to construction, the applicant would prepare a Storm Water Pollution Prevention Plan (SWPPP) to control storm water and soil erosion during the facility's construction using best management practices (BMPs)[5]. To redirect storm water flow around these facilities, diversion berms or drainage swales would be used. Stone filters and check dams would be placed strategically, as needed, throughout the project site to provide areas for sediment deposition and to promote the sheet flow of storm water prior to leaving the project site boundary. Native materials (rock and gravel) would be used where available for the construction of the stone filter and check dams. Stone filters and check dams are not intended to alter drainage patterns but to minimize soil erosion and promote sheet flow. To reduce erosion, storm drainage channels may be lined with a nonerodible material such as compacted riprap, geosynthetic matting, or engineered vegetation. The design would be developed for sheet flow for all storm events less than or equal to a 100-year, 24-hour storm event (HHSG 2011a, App 5.15A).

Permanent diversion channels would be built during the early stages of power plant construction to provide storm water management of the power block area during construction activities. Diversion channels placed around both Solar Plant 1 and Solar Plant 2 power blocks would comprise engineered earthen berms and adjacent swales with rock slope protection. These channels would be designed with a minimum ground surface slope of 0.5 percent to allow positive, puddle-free drainage (HHSG 2011a, App 5.15A).

[5] Storm water and soil erosion BMPs are methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources. BMPs can be classified as "structural" (i.e., devices installed or constructed on a site) or "non-structural" (procedures, such as modified landscaping practices). There are a variety of BMPs available, depending on pollutant removal capabilities. (See California Stormwater BMP Handbook at www.casqa.org.)

Solar Fields – Heliostats

Each solar field would consist of approximately 85,000 heliostats - elevated mirrors with a total reflecting surface of 204.7 square feet. Each heliostat assembly would be mounted on a single support pylon and guided by a computer-programmed aiming control system to track the movement of the sun (HHSG 2011a § 2.2.1.2).

The siting of pylons will be guided by global positioning system (GPS) technology. Installation of the heliostat assemblies would use vibratory technology to insert the pylons into the ground and a rough terrain crane able to mount heliostat assemblies on several pylons before moving to the next location. Vegetation clearing, grubbing[6], and contour smoothing in the heliostat fields would occur where necessary to allow for equipment access and storm water management. In areas where these activities are not required for access or construction, the vegetation would not be removed but would be mowed (if needed) to a height of approximately 12 to 18 inches (HHSG 2011a, App 5.15C).

Solar field development would maintain unobstructed sheet flow, with storm water mostly traveling in existing natural contours and flowpaths. Relatively small rock filters and local diversion berms through the heliostat fields may be installed as required to discourage water from concentrating and to maintain sheet flow. Mowing vegetation, rather than removal, would allow for clearance for heliostat function while leaving soil surface and root structures intact (HHSG 2011a, App 5.15C).

Solar Fields – Roads

The HHSEGS project would contain three types of roads (HHSG 2011b, Attach 5.15ER, CH2 2012u) as shown on **Soils & Surface Water Figure 6**:

- 20-ft wide internal perimeter asphaltic paved access roads – located between the power plants and along portions of the site boundary
- 12 to 20-ft wide dirt (aggregate base) access roads located along portions of the site boundary, as well as internally to the power plants
- 10-ft wide dirt heliostat maintenance paths[7] located concentrically around the power plants, placed approximately 152 feet apart

Most of the natural drainage features would be maintained and any grading required would be designed to promote sheet flow where possible. At some washes, limited grading may be required. Paved access roads would be protected from floods with ditches, culverts, and local fords with reinforced concrete shoulders (HHSG 2011a, App 5.15A).

[6] Grubbing of vegetation includes the removal of any remaining roots or stumps after cutting vegetation to clear land.

[7] Multiple sections in the AFC describe these as “20-foot wide drive zones”. For purposes of this section’s analysis, staff assumes that the concentric maintenance paths/drive zones would be ten feet wide because the applicant’s post-construction calculations used this value. This analysis does not assess the proposed project using 20 foot wide concentric roads.

At the site's western boundary, the middle two-thirds of the western perimeter road would be elevated to prevent runoff flow from exiting the project site along existing natural contours and flowpaths (see **Soils & Surface Water Figure 8**). The berm created by the elevated roadway would result in an onsite retention area, designed to decrease post-construction peak flows by retaining runoff and allowing water to infiltrate and evaporate (HHSG 2011b, Attach 5.15ER). The applicant estimates that the maximum flooded area would be approximately 125 acres with a maximum depth of 3.8 feet at its deepest point (see **Soils & Surface Water Figure 9**). The retention area would be designed to drain within 24 hours using three drainage culverts, allowing water to flow under the roadway and into the adjacent area west of the project site. Runoff from large storms would fill the retention area then overtop the roadway, which would function as a broad-crested weir (CH2 2012ll, CH2 2012ii). Because construction of this road would occur early in the construction phase, it would provide storm water management of HHSEGS during construction activities.

Common Area

The common area located at the southeastern corner of the HHSEGS site would include an administration, warehouse, and maintenance complex; an onsite substation; and a parking area for visitors and employees. Construction of these common area facilities would require heavy to medium grading and would occur concurrently with the construction of Solar Plant 1 (HHSG 2011a, App 5.15A).

Similar to the power plant sites, storm water management for the administration complex would include a permanent diversion channel comprising an engineered earthen berm and adjacent swale with rock slope protection. The surface areas within the common area that are used for construction activities would be stabilized and dust suppression maximized with a layer of crushed stone in areas subject to heavy daily traffic (HHSG 2011a, App 5.15A).

Laydown Areas

Temporary construction laydown and parking areas would occupy approximately 180 acres on the west side of the site and approximately 8.5 acres on the solar fields at each power plant site. Temporary construction facilities at the large area to the west include office trailers, parking areas, material laydown areas, a concrete batch plant, and a heliostat assembly facility. The surface areas within the temporary construction areas used frequently would be stabilized and dust suppression maximized with a layer of crushed stone in areas subject to heavy daily traffic (HHSG 2011a, App 5.15A).

To redirect storm water flow around these facilities, diversion berms or drainage swales would be used. Stone filters and check dams would be placed strategically, as needed, throughout the project site to provide areas for sediment deposition and to promote the sheet flow of storm water prior to leaving the project site boundary. These areas would be restored to natural existing conditions[8] once all heliostats are installed onsite and the project is complete (HHSG 2011b, Attach 5.15ER).

[8] See "Restoration of Temporary Disturbance" in the Project Description section of the **FSA**.

Linear Facilities

Onsite

Onsite linear facilities would include underground natural gas pipelines (to supply the auxiliary boiler and nighttime preservation boiler) and underground gen-tie lines (electrical lines to connect generation facilities with the switchyard). These linear facilities as shown in **Soils & Surface Water Figure 7** are located along onsite 20-ft wide access roads (CH2 2012hh).

Offsite

The offsite transmission and natural gas pipeline alignments would be located in Nevada, primarily on federal land managed by the U.S. Bureau of Land Management (BLM), except for small segments of the transmission line in the vicinity of the Eldorado Substation, which is located within the city limits of Boulder City, Nevada.

This proposed "Hidden Hills Transmission Project" would be constructed and operated by Valley Electrical Association, a nonprofit electric utility based in Pahrump, Nevada that services more than 6,800 square miles of land located mainly along the California-Nevada border, but most of it in Nevada. The proposed Hidden Hills Transmission Project would consist of improvements on BLM land (CH2 2012ee) including:

- Approximately 10 miles of new generation tie-line from the HHSEGS project site to the proposed Crazy Eyes Tap Substation located immediately east of the Tecopa Road/SR 160 intersection. The Crazy Eyes Tap Substation would interconnect to the existing VEA Pahrump-Bob Tap 230-kV line.
- Construction and operation of new and existing access roads along each of the proposed transmission alignments

To supply natural gas to the proposed site, Kern River Gas Transmission Company (KRGT) proposes to construct a 12-inch pipeline from the HHSEGS meter station and extending 32.4 miles to KRGT's existing mainline system just north of Goodsprings in Clark County, Nevada (CH2 2012ee).

Although the Hidden Hills Transmission Project and the KRGT natural gas pipeline are located entirely in Nevada (and therefore outside Energy Commission jurisdiction), these proposed projects are considered in this **FSA** as connected actions to the proposed HHSEGS project. Because the proposed linear facilities would be on BLM land, they are considered federal actions requiring review and compliance with the National Environmental Policy Act of 1969 (NEPA). A detailed environmental impact analysis will be prepared by BLM (BLM 2011). A separate construction storm water management program would be prepared for project features located in the State of Nevada and are not addressed in the AFC.

Total Soil Disturbance

Construction of the HHSEGS would affect the areas listed in **Soils & Surface Water Table 6**. Soil disturbance would occur as a result of grubbing, grading, and/or excavation activities. After construction, some of these areas would be covered with

impervious material (i.e. concrete foundations, asphalt pavement, heliostat assemblies) and temporary construction areas would be restored to natural existing conditions.

Soils & Surface Water Table 6
Estimated Soil Disturbance and Impermeable Area of HHSEGS

Element	Total Area	Area of Land Grading and Excavation (construction activities)	Impervious Area (post-construction)
Solar Field – Heliostats	2,994 acres	negligible[1]	806 acres[2]
Solar Field – Roads Paved Roads Dirt Roads		16 acres 189.2 acres	16 acres 0
Solar Plant 1		19 acres[3]	10.5 acres[4]
Solar Plant 2		19 acres[3]	10.5 acres[4]
Common Area	103 acres	14.8 acres	8 acres
Laydown Area	180 acres	180 acres[5]	0
TOTAL	3,277 acres	438 acres	851 acres
Linear Facilities[6] (Nevada)		unknown	unknown

(Source: HHSG 2011b, Attach 5.15ER)

Note 1: No grading required. All-terrain vehicles would install pylons and mount heliostat assembles.

Note 2: Accounts for surface area of all mirrors in horizontal position. Assuming 170,000 heliostats total, each with a 206.4 square feet reflecting surface.

Note 3: Erosion control plans show each solar plant includes a temporary parking area (2.5 acres) and construction laydown area (6 acres).

Note 4: This area includes gravel surfacing, which helps permeability.

Note 5: The Post Construction Hydrologic & Hydraulic Analysis assumes the entire 180 acres would be graded.

Note 6: Onsite linear facilities would be located along paved or fully graded roads. Soil disturbance area of these linear facilities is considered concurrent with these roads.

Water Use

Six onsite groundwater supply wells would be drilled and developed to provide raw water for the HHSEGS project; two new wells per power block (primary and backup) and two wells at the administration complex (HHSG 2011a § 2.2.4). One temporary well would be installed for use at the large construction laydown area on the west, primarily for the onsite concrete batch plant. The estimated annual water requirement during construction is 288 acre-feet per year (CH2 2012p). During construction, water would be used daily for dust suppression and vehicle washing. Other uses include soil compaction, hydrostatic testing, and concrete mixing.

Wastewater Management

During construction, anticipated sources of wastewater would include sanitary wastes, wash water, concrete washout water, paint wash water, piping and vessel hydrostatic test water, and passivating[9] and chemical cleaning fluid waste. Sanitary waste would be contained in portable facilities and routinely disposed of at an offsite treatment/disposal facility by a sanitary service. Excess concrete and concrete washout slurries would be discharged to a temporary washout facility (HHSG 2011a, App 5.15A). Hydrostatic test water and passivating fluid waste, approximately 400,000 gallons and 300,000 gallons total for both solar plants, respectively, would be discharged to the surrounding area or used for dust control if test results meet regulatory standards. Otherwise, the hydrostatic test water would be trucked offsite for disposal at an approved facility (HHSG 2011a, Table 5.14-2).

PROJECT OPERATION

HHSEGS would be designed for an operating life of 25 to 30 years. It is anticipated that the facilities would normally operate at high average annual capacity factors during periods of sunlight (HHSG 2011a § 2.3.2.1). Commercial operation is estimated to begin in Third Quarter 2015 for Solar Plant 1 and Fourth Quarter 2015 for Solar Plant 2.

Soil Erosion

The applicant submitted a Preliminary Draft Construction Storm Water Pollution Prevention Plan/Drainage, Erosion, and Sediment Control Plan ([SWPPP/DESCP] HHSG 2011a, App 5.15A) that lists standard best management practices (BMPs). Disturbed areas would be stabilized with effective soil cover (such as aggregate, paving, or vegetation) as soon as feasible, but no later than 14 days after construction or disturbance is complete in that portion of the site. To reduce erosion potential, BMPs would be implemented in accordance with the approved SWPPP/DESCP. Vegetation would remain but would be cut (when necessary) to a height that would allow clearance for heliostat function while leaving the root structures intact. Occasional cutting of the vegetation would be performed as needed to permit unobstructed heliostat mirror movement.

Access roads to the heliostat arrays for bi-weekly washing of the mirrors would also be used for the occasional cutting of vegetation to reduce the risk of fire due to plant regrowth. To minimize soil erosion from maintenance operations, including travel of mirror washing vehicles on unpaved roads, a dust control plan would be prepared that includes fugitive dust control measures during operations such as use of soil stabilization techniques and limits on vehicle speed (HHSG 2011a, App 5.15A).

Storm Water Control

As discussed above, permanent diversion channels would be constructed around Solar Plant 1, Solar Plant 2, and the administration complex. In addition, an onsite retention area would be created at the site's west perimeter road. These would be maintained during the operational life of HHSEGS. Periodic maintenance would be conducted as

[9] Passivating fluid is used to treat or coat a metal pipe in order to reduce the chemical reactivity of its surface.

required after major storm events and when the volume of accumulated material behind the check dams exceeds 50 percent of the diversion channel's designed volume (HHSG 2011a, App 5.15A).

Areas compacted during construction activities would be restored, as appropriate, to approximate preconstruction compaction levels to minimize the opportunity for any increase in surface runoff (see "Restoration of Temporary Disturbance" in the **Project Description** section of the **FSA**). A majority of solar field development would maintain unobstructed sheet flow along existing natural contours and flowpaths. Relatively small rock filters and local diversion berms through the heliostat fields may be installed as required to discourage water from concentrating. Stone filters and check dams are not intended to alter drainage patterns but to minimize soil erosion and promote sheet flow (HHSG 2011a, App 5.15A).

Grading and mowing during construction could directly result in a permanent loss of a large portion of the ephemeral drainages that are present due to their shallow depths; however, affected drainages would be expected to reform naturally in this landscape where flow patterns are highly variable, both temporally and spatially (HHSG 2011a, App 5.15A).

Each HHSEGS Solar Plant would keep the potentially polluted contact[10] storm water from the power blocks and equipment areas, general facility drainage, process wastewater, and sanitary waste completely separated from non-contact storm water runoff, as described in the Wastewater Management discussion below.

Water Use

Six onsite groundwater supply wells would be drilled and developed to provide raw water for the HHSEGS project; two new wells per power block (primary and backup) and two wells at the administration complex. The water would be used for steam cycle make-up water, wet surface air cooler used in the auxiliary cooling system, condensate polishing to reduce contaminates in the steam/water cycle, power plant equipment wash down, mirror wash water, and domestic uses. The combined 500-MW net capacity of the solar plants would require an average of approximately 90 gpm. To provide adequate operating flexibility, the applicant's estimated annual water requirement is 140 acre-feet per year based on HHSEGS operating at full load (HHSG 2011a § 2.2.4.1).

Wastewater Management

Each HHSEGS Solar Plant would keep the potentially polluted waste water (contact runoff, general facility drainage, process wastewater, and sanitary waste) completely separated from non-contact storm water runoff (HHSG 2011a § 2.2.6.1).

General Facility Drainage

Each HHSEGS Solar Plant would collect contact runoff from the power block to prevent this potentially contaminated water from comingling with non-contact storm water runoff.

[10] Contact runoff refers to storm water in contact with exposed polluted or hazardous materials and/or surfaces that can potentially result in contaminated runoff (containing trace oil, chemicals, metals, toxic substances, or other materials).

The contact runoff would be collected along with wastewater from the plant's raw water use (such as sample drains, containment area washdown, and facility equipment wash water, if cleaning chemicals are not used) through a system of floor drains, hub drains, sumps, and piping and routed to the oil/water separator. From there, the water would flow to the waste collection tank then to a thermal evaporator system with the process wastewater (HHSG 2011a §§ 2.2.6.1, 5.14.4.3.2).

Process Wastewater

The primary wastewater collection system would collect process wastewater from all of the solar plant equipment, including blowdown[11] from the SRSG, natural-gas-fired boiler, demineralization, auxiliary cooling system, and water treatment equipment. Additional sources of wastewater include oil/water separator effluent from power block storm water runoff and general facility drainage. To the extent practical, process wastewater would be recycled and reused. A thermal evaporator system would process the wastewater for recycling back into the service water tank, returning approximately 90 percent of the wastewater for reuse. The reject from the thermal evaporator (approximately 1,360 gallons per day combined for both solar plants) would be trucked offsite for disposal at an approved facility. No reject streams from water treatment are planned to be generated onsite under the proposed treatment scheme (HHSG 2011a §§ 2.2.6.1, 5.14.4.1.2).

Sanitary Waste

The project would require a septic system and leach field at each of the two power blocks and the administration complex. Each of the systems would be designed to treat up to 700 gallons per day of wastewater discharged from toilets, sinks, and showers. Septic tanks would be pumped out as needed by a qualified sanitary service provider (HHSG 2011a, Table 5.14-3).

CONTAMINATED SOIL AND WATER

A Phase I Environmental Site Assessment for the project area concluded that no recognized environmental conditions were associated with the project site. Although the potential of encountering contaminated soil would be low, staff would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation during site characterization, soil grading or soil excavation to determine appropriate actions to be taken in the event contaminated soil is encountered. (Refer to the **WASTE MANAGEMENT** section of this **FSA** for additional information related to contaminated soil).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the expected direct, indirect, and cumulative impacts to soil and surface water resources that could be caused by construction, operation, and maintenance of the HHSEGS. Staff's analysis consists of a description of the potentially "significant" impact, gathering data related to construction and operation

[11] Blowdown is the portion of water drained from a process to remove mineral build-up from concentrated recirculating water. These minerals would cause scaling on equipment surfaces and can damage the system.

of the project, then reaching a conclusion to determine whether or not the project presents a potentially "significant" impact. If staff determines there is a significant impact, then staff evaluates the applicants' proposed mitigation for sufficiency and staff may or may not recommend additional or entirely different mitigation measures that are potentially more effective than those proposed by the applicant. Mitigation is designed to reduce the effects of potentially significant HHSEGS impacts to a level that is less than significant. The determination of significance for potential impacts to soil and surface water resources is discussed below.

Soil Resources

Staff evaluated the potential impacts to soil resources including the effects of construction and operation activities that could result in erosion and downstream transportation of soils and the potential for contamination to soils and surface water. There are extensive regulatory programs in effect that are designed to prevent or minimize these types of impacts. These programs are effective, and absent unusual circumstances, an applicant's ability to identify and implement BMPs to prevent erosion or contamination is sufficient to ensure that these impacts would be less than significant.

The LORS and policies presented in **Soils & Surface Water Table 1** were used to determine the significance of HHSEGS impacts with respect to CEQA.

Water Quality

Staff evaluated the potential of HHSEGS to cause a significant depletion or degradation of surface water resources. (For a detailed analysis of the potential effects on groundwater supplies and groundwater quality, refer to the **WATER SUPPLY** section of this **FSA**).

To evaluate if significant CEQA impacts to water resources would occur, the following questions from CEQA Guidelines, Appendix G were addressed:

- Would the project violate any water quality standards or waste discharge requirements?
- Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?
- Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?
- Would the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?
- Would the project otherwise substantially degrade water quality?

- Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?
- Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?
- Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?
- Would the project be inundated by seiche or tsunami?
- Would the project result in substantial soil erosion or the loss of topsoil?
- Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?
- Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Although the CEQA Guidelines provide a checklist of suggested issues that should be addressed in an environmental document, neither the CEQA statute nor the CEQA guidelines prescribe thresholds of significance or particular methodologies for performing an impact analysis. This is left to lead agency judgment and discretion, based on factual data and guidance from regulatory agencies and other sources where available and applicable. Staff considered compliance with the LORS and policies presented in **Soils & Surface Water Table 1** and whether there would be a significant impact under the CEQA. Where a potentially significant impact was identified, staff or the applicant proposed mitigation to ensure the impacts would be less than significant.

DIRECT IMPACTS

A discussion of the direct and indirect HHSEGS construction and operations impacts and mitigation is presented below. For each potential impact evaluation, staff describes the potential effect, summarizes the applicant's position, and then analyzes impacts for determining significance. If mitigation is warranted, staff provides a summary of the applicant's proposed mitigation and a discussion of the adequacy of the proposed mitigation. In the absence of applicant-proposed mitigation or if mitigation proposed by the applicant is inadequate, staff mitigation measures are recommended.

Soil Erosion Due to Water and Wind

Erosion during Construction

Construction of the project is scheduled to last 29 months. Soil losses would be created by construction and grading activities that would expose and disturb the soil and leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increases in sediment loading to nearby water resources. In the absence of proper BMPs, earthwork could cause significant fugitive dust and erosion.

The magnitude, extent, and duration of those impacts would depend on several factors, including weather patterns in the vicinity of the HHSEGS site, the types of soil that could be affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities could result in accelerated onsite erosion. In addition, high winds during grading and excavation activities could cause wind borne erosion leading to increased particulate emissions that adversely impact air quality. The implementation of appropriate erosion control measures would help conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality.

Power Plant Sites, Common Area, and Laydown Area

The potential for erosion by water during construction is expected to increase as a result of loss of vegetative cover, removal of surface crust, and increased local sediment transport through creation of localized gullies and rills on newly graded areas. The applicant submitted a Preliminary Draft Construction DESCP/SWPPP (HHSG 2011a, Appendix 5.15A) that lists standard BMPs applicable to HHSEGS construction activities along with Water Pollution Control Drawings that show locations of specific BMPs at each power block, the common area, and the large temporary construction laydown area. In addition, the DESCP identifies specific measures to reduce water-related erosion including:

- Temporary erosion control measures would be implemented on active and non-active disturbed areas prior to and at regular intervals throughout the defined rainy season, and year-round prior to storm events.
- Erosion in concentrated flow paths would be controlled by lining channels with a non-erodible material such as compacted riprap, geosynthetic matting, or engineered vegetation.
- Diversion berms (for example, earth dikes) or drainage swales would be used, as needed, to redirect storm water run-on or onsite storm water flow around critical facilities or away from disturbed soil areas and stockpiles.
- Disturbed areas would be stabilized with effective soil cover (such as aggregate, paving, or vegetation) as soon as feasible after construction or disturbance is complete and no later than 14 days after construction or disturbance in that portion of the site has temporarily or permanently ceased.
- Sediment controls would be implemented at the draining perimeter of disturbed soil areas, at the toe of slopes, and at outfall areas.
- Stone filters and check dams would be strategically placed, as needed, throughout the project site to provide areas for sediment deposition and to promote the sheet flow of storm water prior to leaving the project site boundary. Where available, native materials (rock and gravel) would be used for the construction of the stone filter and check dams. Stone filters and check dams are not intended to alter drainage patterns but to minimize soil erosion and promote sheet flow.

The Preliminary Draft DESCP also includes a Monitoring and Reporting Program/Construction Site Monitoring Program to ensure performance standards and to monitor the effectiveness of BMPs.

Solar Fields – Heliostats and Roads

The Preliminary Draft DESCP states that each area of the HHSEGS project would be designed to provide the minimum requirements for access of installation equipment and materials. Most of the natural drainage features would be maintained and any grading required would be designed to promote sheet flow where possible. Areas disturbed by grading and other ground disturbance would be protected from erosion by implementation of appropriate BMPs. Some of the measures listed include:

- Existing vegetation would be preserved when feasible. Vegetation would be cut to a height that will not interfere with construction and operation of the heliostat fields, instead of clearing or grading the entire field.
- Clearing and grading activities would be restricted to areas where foundations, drainage facilities, and all-weather roads must be placed.
- Areas compacted during construction activities would be restored, as appropriate, to approximate preconstruction compaction levels to minimize the opportunity for any increase in surface runoff.
- Effective sediment perimeter controls would be established and maintained at locations where runoff discharges offsite.

Wind Erosion

The Preliminary Draft DESCP also includes standard BMPs for Wind Erosion Control. The following practices were listed to minimize the loss of wind-blown soil from the site:

- Disturbed soil areas of the project site would be watered regularly to control dust and to maintain optimum moisture levels for compaction as needed, but to avoid runoff, the areas would not be watered excessively. Sediment controls may be used at the edges of these areas as necessary to minimize sediment discharge.
- Areas of high erosion may require application of an approved palliative to reduce dust and prevent excess moisture on the road which may attract tortoises.
- At each structure site, the disturbed soil would be watered to form a crust following completion of construction in that location.
- The construction site would post visible speed limit signs to prevent vehicles from traveling at excessive speeds.

Linear Facilities

Although the amount of excavation required to install the onsite underground transmission lines and natural gas pipelines would be relatively minor, soil disturbance associated with buried linear facilities could total to a considerable amount of soil disturbance. Activities such as clearing vegetation, excavation, and vehicle travel would present the highest potential for erosion. However, for the HHSEGS project the onsite linear facilities would be located along proposed paved internal roads. The Preliminary Draft DESCP does not specifically mention measures to implement for onsite facilities.

The applicant does not include measures for the offsite linear facilities located in Nevada. A separate construction storm water management program would be prepared

for the Hidden Hills Valley Electrical Transmission Project and KRGT natural gas pipeline activities in Nevada.

Staff Evaluation of Erosion during Construction

Staff reviewed the Preliminary Draft DESCP and agrees that BMPs during construction would reduce or avoid impacts to soil from erosion. To protect surface waters, standardized storm water and soil erosion Best Management Practices (BMPs)[12] have been determined by the SWRCB and RWQCBs to be the most effective, practical means of preventing or reducing pollution from nonpoint sources. The conceptual plans for erosion control during construction appear reasonable, but there are additional elements that should be incorporated into the final DESCP that would be developed as required in Condition of Certification **SOILS-1**.

- The Preliminary Draft DESCP currently does not include BMPs that would be implemented for the onsite linear facilities. Although the proposed BMPs for the linear facilities may be similar to those already proposed for other construction activities, a discussion should be included in the BMP narrative section of the document.
- The DESCP should reflect the most recent design plans of the proposed HHSEGS project. Since the initial filing of the original AFC, some changes to the project have occurred such as removal of two boilers from each power block, relocation of various elements within the power blocks, undergrounding of onsite linear facilities, and modifications to the west perimeter retention area (CH2 2012p, CH2 2012ii). Any adjustments that would alter Water Pollution Control Drawings, change the BMP strategy, or result in revised hydrology or hydraulic calculations should be reflected and addressed in an updated DESCP.

Staff believes that compliance with an approved DESCP accordance with Condition of Certification **SOILS-1** would reduce the impacts of soil erosion during construction. In addition, the project activities require that it be covered under the federal General Construction Permit (SWRCB Order No. 2009-0009-DWQ). To ensure compliance with this order, staff proposes Condition of Certification **SOILS-2** which requires a construction SWPPP. Also, conditions of certification in the **AIR QUALITY** section of this **FSA** require a construction mitigation plan to prevent significant impacts from fugitive dust and wind erosion during construction. With implementation of BMPs and associated monitoring activities included in the approved DESCP and SWPPP, impacts on soil would be expected to be less than significant during construction of the proposed HHSEGS project.

Erosion During Operations

Soil losses would be ongoing after the construction of the HHSEGS project. Areas disturbed during the construction phase are subject to potential erosion during the operational life of the proposed project. HHSEGS would be designed for an operating life of 25 to 30 years.

[12] BMPs can be classified as "structural" (i.e., devices installed or constructed on a site) or "non-structural" (procedures, such as modified landscaping practices). There are a variety of BMPs available, depending on pollutant removal capabilities.

Onsite Erosion

The estimated total area of land grading and excavation during construction of the HHSEGS project would be about 438 acres, as shown in **Soils & Surface Water Table 6**. After project completion, the temporary parking and construction laydown areas would be restored to natural existing conditions and about 45 acres would become impervious due to the addition of concrete foundations and asphalt paving. The balance of the previously disturbed area, roughly 200 acres, would be susceptible to potential erosion during the operational life of the proposed project. Furthermore, the addition of impervious surfaces to an area previously undeveloped would increase velocities of storm water runoff (see "Flooding" discussion below), which would increase the erosion potential of open soil areas.

The applicant submitted a Preliminary Draft DESCP/SWPPP (HHSG 2011a, App 5.15A) that states permanent erosion control measures would reduce potential soil related impacts, including gravel, landscaping, and engineering drainage channels. These would be stabilized areas with very little or essentially no risk of erosion. In addition, relatively small rock filters and local diversion berms through the heliostat fields may be installed as required to discourage water from concentrating and to maintain sheet flow. These all would serve to prevent wind and water erosion and maintain some water infiltration capacity of the soil.

Staff agrees that implementation and maintenance of permanent BMPs during operations would reduce or avoid impacts to onsite soil from erosion. The Preliminary Draft DESCP is reasonable in concept, however it does not sufficiently discuss post construction measures for erosion and sediment control. The document should address exposed soil treatments proposed during operation of the project for both road and non-road surfaces. A maintenance schedule should include post construction maintenance of BMPs applied to disturbed areas following construction. Staff believes that compliance with Condition of Certification **SOILS-1** which would require the applicant to develop and implement an approved DESCP would reduce the impacts of soil erosion during operation of the proposed project.

Although modeling and calculations can be used to estimate post-construction flows and provide a basis for structural design parameters, alluvial flows are very complex. Flood flows from the mountains are initially confined in incised channels, but at the site the flood flows are broadly distributed (known as sheet flow) and less confined and can take random paths across the fan. Predicted flow depths and velocities have a potential uncertainty because they do not account for the dynamics of erosion and sedimentation which carry and deposit sediments at various locations along the margin of the alluvial fan where the site is located. Where obstructions such as heliostats and fences are encountered, flows can have erosive effects which could undermine their stability. The consequences of flash flood damage or modified sedimentation and erosion rates may be significant. Staff proposes Condition of Certification **SOILS-5** requiring a Storm Water Damage Monitoring and Response Plan to reduce these potential impacts.

Offsite Erosion

The project's addition of impervious surfaces could also increase velocities of storm water runoff leaving its boundaries, possibly increasing the potential to erode offsite

areas downstream of the project. The applicant proposes an onsite retention area to address the increase in peak flows from project development by controlling the rate that storm water runoff leaves the site (HHSG 2011b, Attach 5.15ER). The area would retain storm water through use of a berm created along the western site boundary by elevating the middle two-thirds of the western perimeter roadway above existing grade. Runoff collected at the berm would slow down flows and allow water to infiltrate and evaporate. The retention area would be designed to drain within 24 hours using three drainage culverts, conveying flow under the roadway and into the adjacent area west of the project site. Runoff from large storms would fill the retention area then overtop the roadway, which would function as a broad-crested weir (CH2 2012ll), as shown on **Soils & Surface Water Figure 9**.

While the retention area would reduce potentially damaging post-construction peak flows, elements of this strategy could potentially still cause offsite erosion.

- By draining the retention area through three 18-inch pipes, water collected from a large area would be concentrated into three points. Flow velocities at the pipe outlets could scour and erode the soil offsite.
- The 180-acre temporary construction area, located offsite and downstream of the retention area, would be more susceptible to erosion compared to surrounding areas not disturbed by construction activities. Although the applicant proposes to restore this area to natural existing conditions, vegetation for soil stability would take time to establish.
- The fill material used in the construction of a typical roadway embankment would not be a sufficient barrier against water. The typical roadway embankment construction does include the same level of geotechnical engineering analysis required for flood control structures (such as a levee). Therefore, a typical roadway embankment would be subject to damage caused by piping, seepage, and erosion from overtopping.

The applicant submitted a Preliminary Draft DESCP/SWPPP (HHSG 2011a, App 5.15A) that states permanent erosion control measures would reduce potential soil related impacts. Although Velocity Dissipation Devices[13] were listed in the suite of erosion control measures, their importance in reducing offsite erosion warrants a more detailed discussion in the DESCP including specifics such as locations, installation, and ongoing maintenance during operations. In addition, the DESCP should also include a more detailed discussion on the proposed strategy to restore any disturbed areas, while at the same time meeting requirements of relevant conditions of certification in the **BIOLOGICAL RESOURCES** section of the **FSA**[14].

To address the potential significant offsite erosion from storm damage to the retention area berm (west perimeter road), staff proposes Condition of Certification **SOILS-5**

[13] Approved BMPs under Fact Sheet EC-10 of California Stormwater BMP Handbook (www.casqa.org)

[14] Including but not limited to Conditions of Certification: **BIO-8** (General Impact Avoidance and Minimization Measures), **BIO-18** (Weed Management Plan), and **BIO-19** (Special-Status Plant Impact Avoidance and Minimization Measures).

requiring a Storm Water Damage Monitoring and Response Plan to reduce these potential impacts in four ways:

1. Establish design criteria for berm construction based on site specific studies and reports to withstand storm water flows of a 100-year storm event.

2. Establish an ongoing maintenance plan to ensure all storm water management measures are functioning properly, through periodic inspection before the first seasonal storms and after each storm event throughout the year.

3. Establish and implement a response plan after every occurrence of damage (from a storm event or other cause) to clean up and repair damage to the berm.

4. Develop and implement a process to monitor incidents and propose modifications and/or improvements to address ongoing issues.

Staff believes that compliance with an approved DESCP in accordance with Condition of Certification **SOILS-1** and an approved Storm Water Monitoring and Response Plan in accordance with Condition of Certification **SOILS-5** would reduce the impacts of soil offsite erosion during operation of the proposed project.

Water Quality of Surface Waters

HHSEGS could have an adverse effect on water quality if discharges create pollution, contamination, or nuisance. Construction and operation of an industrial facility can impact the quality of surface waters by any of the following activities:

- Grading or clearing of land so that sediment is discharged into a water resource. Sediment is considered a pollutant with potential to cause or contribute to the degradation of a water resource's beneficial uses.
- Increasing impervious surface areas resulting in increased amount of storm water runoff volume and rate. This can cause substantial flooding, erosion, and/or siltation, which could impact water resources.
- Placing development in, or discharging sediment into, a river, stream, lake, wetland or water of the US and/or water of the state[15], or into a buffer area for one of these water bodies. Impacts or losses to these special aquatic resources may require specific mitigation measures.
- Storing equipment, raw materials, finished products, or waste products in a manner that exposes them to precipitation and/or storm water runoff. Contact runoff[16] could concentrate various pollutants that would then discharge to a water resource.
- Discharging wastewater from an industrial or commercial process. Because of the high concentrations of total dissolved solids and the further concentration through

[15] Refer to the **BIOLOGICAL RESOURCES** section of this **FSA** for further discussion on jurisdictional determination of wetlands or watercourses as a Water of the US or a Water of the State.

[16] Contact runoff refers to storm water in contact with exposed polluted or hazardous materials and/or surfaces can potentially result in contaminated runoff (containing trace oil, chemicals, metals, toxic substances, or other materials).

evaporation, the liquids could be considered “designated wastes” with regulated disposal requirements.

The following discussion analyzes project information to determine whether HHSEGS would sufficiently avoid or reduce the potential impacts listed above. Where appropriate, staff recommends conditions of certification to ensure that any impacts are less than significant and the project complies with applicable LORS.

Sediment Increase

To prevent the discharge of sediment, the HHSEGS would implement temporary BMPs during construction and permanent BMPs during operation to prevent or reduce soil erosion, as discussed in “Soil Erosion Due to Water and Wind” above. The SWRCB and RWQCBs have determined that standardized storm water and soil erosion BMPs are the most effective, practical means to protect surface waters by preventing or reducing pollution from nonpoint sources. Staff agrees that carefully chosen BMPs for both construction and operation activities could effectively prevent or reduce sediment discharge into water resources. Staff believes compliance with the conditions of certification relating to soil erosion (identified in the “Soil Erosion Due to Water and Wind” discussion above) would ensure that the impact of sediment to surface water quality would be less than significant.

Impervious Surface Area

To prevent an increase in storm water flows discharged offsite as a result of the increase of impervious area, HHSEGS proposes an onsite retention area located along the west perimeter road, as discussed in “Onsite Area Flooding” below. The retention area, located within the project boundary (see **Soils & Surface Water Figure 8**), would control the flow of water offsite to match the flow rate of pre-construction conditions. This “collection and treatment” approach creates a point-source discharge that could increase the volume and possible amounts of pollutants, even when peak discharge rates of post construction are matched to rates of preconstruction. Because this point-source discharge is not upstream of an impaired water body and provided the applicant addresses potential erosion caused by the retention area through Conditions of Certification **SOILS-1** and **SOILS-5** (see “Offsite Erosion” discussion above), staff does not identify any significant impacts to water quality as a result of added impervious surfaces or the retention area.

Aquatic Resources

To avoid impacts or losses to special aquatic resources, HHSEGS proposes to implement a Biological Resources Mitigation Implementation and Monitoring Plan during construction activities (refer to the **BIOLOGICAL RESOURCES** section of this **FSA**) in addition to implementing standardized storm water and soil erosion BMPs. Because details of such a plan are still unknown pending the identification of specific mitigation and monitoring requirements, the applicant submitted a plan outline as a suggested framework.

The applicant stated in its AFC that the U.S. Army Corp of Engineers (USACE) is not anticipated to assert jurisdiction over the ephemeral washes and, therefore, a CWA Section 404 Permit and Section 401 Water Quality Certification would not be needed.

Because compliance with these two permits would likely require additional mitigation measures, the applicant did not propose additional measures. The USACE has since reviewed and assessed the HHSEGS site and identified two drainages as “Waters of the US” (CH2 2012k). As a result, a Section 404 Permit would be required from USACE, which in turn would result in the requirement of a Section 401 Water Quality Certification from Lahontan RWQCB. Section 401 of the CWA gives the Regional Boards the authority to consider the impacts of the entire project and require mitigation for volume, velocity, and pollutant load of the discharge from new outfalls to surface waters designated as “Waters of the State”.

USACE has not yet finalized their analysis and Lahontan RWQCB is currently reviewing the project for compliance with state water quality standards. If USACE and Lahontan RWQCB determine that additional mitigation measures would be necessary under CWA Sections 404 and/or 401, staff anticipates that compliance with those measures would address impacts to special aquatic resources and water quality. In the **BIOLOGICAL RESOURCES** section , staff recommends the applicant be required to provide a copy of the 404 and/or 401 Certifications, in accordance to Condition of Certification **BIO-7** (Biological Resources Mitigation Implementation & Monitoring Plan). See the **BIOLOGICAL RESOURCES** section of the **FSA** for a discussion of potential impacts and mitigation.

Polluted Runoff

To prevent contact runoff from discharging offsite during construction activities, the applicant has identified a combination of standard BMPs within the Preliminary Draft Construction DESCP/SWPPP for pollution control measures to be implemented during construction. The BMPs would limit or reduce potential pollutants at their source before they come into contact with storm water. These BMPs also involve daily activities of the construction site, are under the control of the construction contractor, and are additional “good housekeeping practices,” which involve maintaining a clean and orderly construction site.

Staff agrees that implementation and maintenance of the identified BMPs during construction would reduce or avoid impacts of contact runoff and recommends Conditions of Certification **SOILS-1** and **-2** requiring an approved DESCP and Construction SWPPP. Furthermore, to reduce the potential impacts from operation of a temporary concrete batch plant during construction, Condition of Certification **SOILS-3** requires an industrial Storm Water Pollution Prevention Plan (Industrial SWPPP) to ensure proper control and use of equipment, materials, and waste products from temporary batch plant facilities. With implementation of these conditions of certification, impacts from polluted runoff would be avoided or reduced to less than significant during construction of the proposed HHSEGS project.

To prevent contact runoff from discharging offsite during operations, HHSEGS would collect contact runoff from power block and equipment washing in an oil/water separator. The effluent would be mixed with and processed as industrial wastewater (see “Operations Wastewater” discussion below). Staff also recommends Condition of Certification **SOILS-4** requiring that each operating solar plant comply with all requirements of the General NPDES Permit for Discharges of Storm Water Associated

with Industrial Activity, including the development of an Industrial SWPPP, unless otherwise documented that this permit is not required by the SWRCB[17]. Similar to the Industrial SWPPP, **SOILS-1** requires that the DESCP address appropriate methods and actions for the protection of water quality and soil resources for both the construction and operation phases of the project. Also, **SOILS-5** would reduce the potential of pollutants caused by storm damage from leaving the site.

Furthermore, Condition of Certification **WORKER SAFETY-2** would require a Hazardous Materials Management Program, and Condition of Certification **WASTE-4** would require an Operation Waste Management Plan. Both documents would be developed by the applicant to address handling, transportation, tracking, usage, storage, emergency response, spill control and prevention, training, record keeping, and reporting of hazardous wastes on the site. Other conditions of certification in the **WASTE MANAGEMENT** section of this **FSA** address wastes, including cleanup of all spills of hazardous substances. With implementation of these conditions of certification, impacts from polluted runoff would be avoided or reduced to less than significant during operation of the proposed project.

Operation Wastewater

To prevent the discharge of untreated industrial wastewater or untreated sanitary wastewater from entering nearby water resources, each HHSEGS Solar Plant would keep the potentially polluted waste water (contact runoff, general facility drainage, process wastewater, and sanitary waste) completely separated from non-contact storm water runoff, Sanitary waste would remain contained within the septic system. Industrial wastewater would remain within the power block and processed through the thermal evaporator system. Hazardous liquids would be meticulously handled to prevent spills and accidental release. Wastewater produced from the energy generation process would be processed through the thermal evaporator system. Potentially contaminated storm water (rain that falls onto industrial equipment or other surfaces that might contaminate the storm water) would be collected and processed through the thermal evaporator system. HHSEGS would transport the reject from the thermal evaporator and the sanitary waste from the septic tanks to approved facilities for offsite disposal. (See “Operations Wastewater” and “Sanitary Wastewater” discussions below.) Non-contact storm water would be directed away from the power blocks and allowed to flow toward the west. All BMPs and conditions of certification would strive to prevent any chemical or hazardous pollutants from mixing with the "clean" storm water. With implementation of these measures, impacts from sanitary or industrial wastewater would be avoided or reduced to less than significant during operation of the proposed project.

Flooding

Flooding is usually defined as the inundation of dry land adjacent to a channel when excess flow exceeds its banks. Because ephemeral streams like those at the site do not have permanent flow, their banks are formed in response to rainfall events which are

[17] For electric generating facilities, industrial storm water permits are required if fuel is burned to generate steam that is used to turn a generator. Concentrating solar power facilities are not one of the regulated industrial categories because solar energy replaces the need for fuel.

infrequent and vary in intensity. The extreme changes in flow conditions causes flooding, erosion, and sedimentation that can drastically alter the channel's shape and alignment. Consequently, desert washes can be transient and may vary in course from one storm event to another (resulting in heavy braiding of shallow channels). For purposes of this analysis, impacts of flooding will consider the natural behavior of ephemeral streams.

Onsite Area Flooding

Proposed construction of the HHSEGS project would alter existing onsite drainage patterns which could potentially cause or increase onsite flooding. For the majority of the project site, existing drainage patterns would generally remain the same. However, changes to a number of areas such as grading, adding impervious surfaces, diverting flows, and impeding flows can increase the amount of storm water runoff volume and rate. An analysis of each impact and the applicant's proposal to address impacts follows below.

Grading and Increase of Impervious Area

Heavy to medium grading would be performed within each solar plant's power block area and the common area complex, necessary to prepare the sites for construction of the various facilities. Grading would also be needed to create a system of roadways for access to each facility and maintenance of the heliostats, although grading in the solar fields would match natural contours and promote sheet flow where possible. Three areas of temporary grading would occur for construction laydown and parking: one within the large 180 acre area located adjacent to the site's west boundary, and one near each solar plant's power block area. Estimated amount of total grading (both temporary and permanent) would be about 438 acres, as shown in **Soils & Surface Water Table 6**. After project completion, the temporary parking and construction laydown areas would be restored to natural existing conditions, resulting in approximately 241 acres of land permanently altered by graded access roads and constructed facilities.

While most of the permanently graded area would remain "dirt" surface, the addition of concrete foundations and asphalt paving would create approximately 45 acres of impervious surface. Because water is not able to infiltrate into impervious surfaces, storm water runoff quickly concentrates and flows downstream, increasing both the volume and velocity of accumulated water. In addition, the heliostat assemblies would essentially function as thousands of rooftops and create approximately 806 acres of impervious surfaces, covering about 26 percent of the project site (see **Soils & Surface Water Table 6**). However, because the heliostats would be installed such that surface runoff flows to the pervious dirt areas of the solar field, impacts are considerably less severe than a contiguous stretch of impervious area.

Diversion Channels

In three areas (Solar Plant 1, Solar Plant 2, and the administration building), permanent diversion channels would be constructed to redirect storm runoff around these structures and prevent damage from flooding that occurs naturally due to existing topography. Solar Plant 2, in particular, is located in an area that experiences existing flood flows during storm events (see **Soils & Surface Water Figure 5**). The

Preconstruction Hydrology Analysis shows that a 100-year, 24-hour storm event[18] would likely result in flood flows approximately two feet deep, and approximately one foot deep from the more frequent 10-year, 24-hour storm event. The diversion channels around the administration building and each solar block would protect these structures from natural ephemeral flooding. Similarly, additional temporary diversion channels would also redirect flows around construction laydown and temporary parking areas during the construction activities of the project. Because of the general flow-through design of the solar fields, the diversion channels would not redirect runoff flows in a way that would adversely flood other areas either onsite or offsite. Also, **SOILS-5** (Storm Water Damage Monitoring and Response Plan) would require maintenance and monitoring of diversion channels during operations for added protection against storm damage.

Retention Basin

The applicant submitted an Existing Condition Hydrologic & Hydraulic Analysis (HHSG 2011a, App 5.15C) and a Final Post Construction Hydrologic & Hydraulic Analysis (HHSG 2011b, Attach 5.15ER) to compare the differences in peak flow, hydraulic depths, and velocities between the existing condition and the post construction conditions. Staff reviewed both reports and found the methodology and assumptions for both analyses appropriate and reasonable[19]. Because the applicant anticipates an increase in the project's post construction peak flows due to proposed changes such as grading, impervious surfaces, and diversion channels, the post construction analysis includes an onsite retention area along the west perimeter road (see **Soils & Surface Water Figure 8**).

The retention area would be created via a berm, constructed by elevating the west perimeter road above existing grade to a constant elevation of 2588.8 feet for a portion of the road's length[20]. The applicant estimates that the berm would decrease post construction runoff to better match preconstruction runoff. For smaller, more frequent rain events such as the 2-year, 24-hour storm, the road would stop runoff from flowing across that portion of the western project boundary, allowing the retained water to infiltrate and evaporate. Three 18-inch discharge pipes would be installed at the low point of the retention area to ensure it would drain within a 24-hour period after a storm event (CH2 2012ii). For larger storms, the retained water would build up to above the road elevation and weir over it (**see Soils & Surface Water Figure 9**). For the 100-year, 24-hour storm, the applicant calculates that post construction peak flow[21] would be

[18] A design storm event is a hypothetical storm event, of a given frequency interval and duration, used to estimate how often storms of a given magnitude will occur, based on historical rainfall information. A 100-year, 24-hour design storm event corresponds to a major storm (the probability of occurrence in any given year is one in 100, or a one percent chance) and is used to represent flows with the potential to cause property damage and other impacts.

[19] Staff verified that a preapproved hydrologic analysis methodology and appropriate protocols (HEC-1 and FLO-2D) were used to generate calculated values for the preliminary analysis.

[20] The north and south ends of the west perimeter road would match existing elevations. The elevated portion would be about 1500 feet in length, beginning approximately 3000 feet north of TecopaRoad and would return back to existing elevation approximately 2100 feet prior to the north end of the road.

[21] This peak flow was calculated at a point located downstream of the 180-acre temporary laydown area to account for its contribution to runoff. The analysis assumed this laydown area would be entirely graded.

10,783 cfs compared to the preconstruction peak flow of 10,790 cfs (HHSG 2011b, Attach 5.15ER).

The elevated west perimeter road (berm) would decrease post construction runoff to better match preconstruction runoff, but this retention area would also clearly cause substantial onsite flooding. For the 100-year, 24-hour storm, the berm would retain 195.4 acre-feet of water across approximately 125 acres of land, with depths ranging from about four feet deep (at the base of the road) to about half a foot deep (toward the east). Because the berm would function as a weir, the estimated onsite flooding would occur at the western site border, as shown on **Soils & Surface Water Figure 10**. Because drainage pipes would sufficiently ensure drainage of the retention area within a 24-hour period (thus reducing the risk of closely spaced storms exacerbating flood depths), this onsite flooding would not be expected to encroach into either of the Solar Power Plants or into the common area. Therefore, staff does not identify any significant impacts to these structures as a result of onsite flooding.

However, staff notes that long-term sediment transport to this retention area could alter the expected storage capacity at the base of the road and could over time affect flow velocities that weir over the berm. Also, the berm may experience potential damage from the weir flow over time (see the discussion under “Offsite Erosion” above). Permanent erosion control measures and sediment management for the berm should be identified and discussed in an updated DESCP.

Although the retention area would not impact the proposed structures, repeated flooding would occur among the heliostats in the solar fields, especially those located on the west side of the proposed site. Staff acknowledges the applicant has completed a thorough hydrologic analysis, but notes that predicted flow depths and velocities on undeveloped alluvial fans have potential uncertainty. The consequences of flash flood damage or modified sedimentation and erosion rates may be significant. Staff proposes Condition of Certification **SOILS-5** (Storm Water Damage Monitoring and Response Plan) to reduce potential impacts caused by large storm event in four ways:

1. Establish specifications for heliostat installation and west perimeter road (berm) construction based on site specific studies and reports (e.g. Pylon Insertion Depth and Heliostat Stability Report). This ensures that heliostats and the west perimeter road (berm) are designed to withstand storm water scour of a 100-year storm event.

2. Establish an ongoing maintenance plan to ensure all storm water management measures are functioning properly, though periodic inspection before the first seasonal storms and after each storm event throughout the year.

3. Establish and implement a response plan to clean up damage and prevent release of sediment or pollutants after every occurrence of damage from a storm event or other cause.

4. Develop and implement a process to monitor incidents and propose modifications and/or improvements to address ongoing issues.

Furthermore, as the proposed project plans evolve from the conceptual and preliminary phases, any changes affecting hydrology or hydraulics would require an updated

comprehensive analysis for purposes of **SOILS-5**. Examples include: the use of certain commercial dust suppressants applied onto dirt roads that would increase the total impervious area of the site, and structural changes to the proposed west perimeter road (berm) that would increase or decrease retention time.

In addition, standing water onsite might have impacts to biological resources given the scarcity of water in the desert. For example, standing water has the potential to attract nuisance predators such as ravens to the site. See the **BIOLOGICAL RESOURCES** section of this **FSA** for further discussion on the potential impacts of standing water to biological resources and possible mitigation required.

Offsite Area Flooding

Grading and Increase of Impervious Area

Numerous ephemeral drainages flow through the proposed HHSEGS site, originating from the east and discharging to the west toward the dry lake bed. Due to the episodic rainfall of the region and transient nature of the drainages, offsite flows can easily exceed these shallow channels and result in flooding. Modeling of the site in its present undeveloped state results in offsite flows to areas downstream (property west of the site) as indicated in **Soils & Surface Water Table 5**. As discussed above, proposed grading and construction of HHSEGS would increase the amount of impervious area onsite. This would increase the amount of storm water peak discharge leaving the site and could exacerbate the naturally occurring floods downstream of the site.

The applicant proposes to create a retention area that would decrease post construction runoff rates. Because the peak discharge of the 100-year, 24-hour storm event leaving the site during post construction conditions would be very close to discharge of preconstruction conditions, the impacts of offsite downstream flooding (to areas located west of the project site) would be reduced. Staff agrees that the proposed project would not exacerbate existing flooding conditions to the areas located west of the project site, and impacts would be less than significant.

Retention Area

Although the retention area would cause substantial onsite flooding, the inundated area (as shown in **Soils & Surface Water Figures 8**, **9**, and **10**) would not extend past the proposed site's borders to flood offsite areas. However, staff notes that long-term sediment transport to this retention area could alter the expected storage capacity at the base of the road and could affect flow velocities that weir over the berm. Also, the berm may experience potential damage from the weir flow over time (see the discussion under "Offsite Erosion" above). Permanent erosion control measures and sediment management for the retention area should be identified and discussed in an updated Drainage, Erosion, and Sediment Control Plan (DESCP). With this effective sediment management control, staff believes that offsite flooding due to the proposed retention area could be prevented.

Staff acknowledges the applicant has completed a thorough hydrologic analysis, but notes that predicted flow depths and velocities on undeveloped alluvial fans have potential uncertainty. The consequences of flash flood damage or modified

sedimentation and erosion rates may be significant. Staff proposes Condition of Certification **SOILS-5** (Storm Water Damage Monitoring and Response Plan) to reduce potential impacts to the retention area caused by large storm events.

Impediments to Existing Flow Conditions

Tecopa Road, a county road that borders the south side of the project site, has historically experienced flooding due to storm events (see the "Area Flooding" discussion above under "Local Setting – Charleston View"). The applicant's pre- and post-construction analysis do not show a significant difference in Tecopa Road flood depths between the existing condition (shown on **Soils & Surface Water Figure 5**) and the post construction conditions (shown on **Soils & Surface Water Figure 10**), but estimated post construction Tecopa Road flooding may not be accurate. The applicant's analysis represented post-construction site conditions by incorporating the following proposed elements: impervious surfaces (heliostats, buildings, asphalt roadways and parking lots), graded dirt roads, protective diversion berms around power blocks and administration complex, and elevated west perimeter road. The analysis did not incorporate the perimeter fence (with desert tortoise exclusion fencing) or the landscape screening[22] proposed along the perimeter of the project site. The tortoise fencing in particular has the potential to trap vegetation and debris which could block or slow the flow of water to the site (see **Soils & Surface Water Figure 11**). These two elements would impede existing flows and could exacerbate flood events at Tecopa Road.

As shown on **Soils & Surface Water Figure 12**, flows from the Stump Springs area cross Tecopa Road before encountering the HHSEGS property boundary. The perimeter fencing and landscape screen would impede these flows, causing a portion of the flow to be diverted west along Tecopa Road while the rest would flow onto the HHSEGS site. Staff identified the following potential impacts:

- increased depths and frequency of flooding along the roadway adjacent to the site, and
- increased flow along the roadway shoulder.

The following discussion analyzes project information to determine whether HHSEGS would sufficiently reduce the potential impacts listed above. Where appropriate, staff recommends conditions of certification to reduce impacts.

Adjacent Roadway Flooding

To estimate the potential increased flood depths caused by the proposed perimeter elements (fencing and landscaping), staff used Manning's equation for open channel flow. Manning's equation can be simplified for sheet flooding because water depth is much smaller than floodplain width (i.e. a foot deep compared to a mile wide), which results in the hydraulic radius approximately equal to the depth.

[22] See Condition of Certification **BIO-9** (Desert Tortoise Clearance Survey and Exclusion Fencing) in the **BIOLOGICAL RESOURCES** section of this **FSA** for requirements to minimize impacts to desert tortoise. See Condition of Certification **VIS-2** (Landscape Improvements, Permanent Fencing and Screening) in the **VISUAL RESOURCES** section for requirements to reduce the visual impacts to viewers from Tecopa Road and the Charleston View residential area.

Manning's equation	Simplified equation
$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$	$D = \left[\frac{Q n}{1.49 W S^{1/2}} \right]^{3/5}$
where Q = flow rate (cfs) n = roughness coefficient of the channel A = cross-sectional area of the channel (square feet) R = hydraulic radius = A/P (feet) P = wetted perimeter, the amount in contact with water (feet) S = slope of the channel energy gradient	where D = water depth (feet) Q = flow rate (cfs) n = roughness coefficient of the floodplain W = floodplain width (feet) S = slope of the floodplain energy gradient

The simplified equation was used to make a direct relationship between the increase in flood depth and effects of the proposed perimeter elements by making the following assumptions:

- The roughness coefficient 'n' represents physical characteristics of the floodplain at the site perimeter. For preconstruction conditions, staff used an 'n' value of 0.03 to represent undisturbed desert terrain. To represent the change in floodplain characteristics due to the perimeter fence and landscape screening, an 'n' value of 0.16 was used[23].
- Because the perimeter fence only affects a portion of the floodplain rather than the entire area, staff represented the post-development flood depths by calculating the average of flood depths without the fence (n=0.03) and with the fence (n=0.16). Staff used the average of the two values, or n = 0.10, to represent the overall post-development 'n' for the area at and around the project site perimeter.
- The flow rate 'Q' represents the portion of flows from Stump Springs that encounters the site. Because the floodplain width and slope are assumed not to change from pre- to post-construction, the value of 'Q' would also stay constant. Therefore, the only component that would change in the simplified Manning's equation is the roughness coefficient 'n', which would result in a change in water depth (flooding).

Given these assumptions, the simplified equation above can be used to compare average flood depths before and after project development as follows:

$$\frac{D_{post}}{D_{pre}} = \left[\frac{n_2}{n_1} \right]^{3/5}$$

where: n_2 is the average post-development n = 0.10
n_1 is the pre-development n = 0.03

[23] Staff estimated the post-construction n using the USGS method (USGS1989). The base value for the flood plain's natural surface (n=0.03) is the same as preconstruction. Corrections were added for obstructions (perimeter fencing = 0.03) and vegetation (landscape screening = 0.10).

Therefore, the ratio of flood depth for post-development and pre-development conditions is 2.1. In other words, the elements proposed for the project's perimeter could potentially double existing flood depths at Tecopa Road.

Soils & Surface Water Table 7 shows estimated flood depths, assuming the site encounters half the flows from the Stump Springs area. Smaller storms could see an increase in flow depth of a few inches, while the larger storms could increase by more than a foot. Since depths of floods would increase for all storms, frequency of flooding would increase during smaller storms.

Soils & Surface Water Table 7
Estimated Flood Depths at Tecopa Road

Storm Event	Stump Springs flows	Flows to Site **Q**	Pre-Develop Flooding	Post-Develop Flooding	Pre vs. Post Increase
100 yr	15900 cfs	7950 cfs	2.1 ft	4.3 ft	2.2 ft
25 yr	7400 cfs	3700 cfs	1.3 ft	2.7 ft	1.4 ft
10 yr	3800 cfs	1900 cfs	0.9 ft	1.8 ft	0.9 ft
5 yr	2100 cfs	1050 cfs	0.6 ft	1.3 ft	0.7 ft
2 yr	300 cfs	150 cfs	0.2 ft	0.4 ft	0.2 ft

Notes:

- Values of Stump Springs flow rates for different storm events are from the applicant's calculated flows (HHSG 2011a, App 5.15C).
- Assumes the site crosses half the width of the floodplain created by flows from Stump Springs.
- Pre-Development n = 0.03 and Post-Development n = 0.10

The estimated flood depths presented above are rough averages taken across the area at and around the project site perimeter. Although flood depths at localized areas along the perimeter would be more accurately calculated using two-dimensional modeling computer software specifically designed for this purpose, staff concludes these estimates are sufficient to show that flooding impacts to Tecopa Road would be potentially significant.

Inyo County's requirement for Flood Damage Prevention (Title 14, Chapter 14.29) identifies areas of special flood hazard as the same identified by FEMA. While the project would comply with this section of Inyo County Code because it is located outside the FEMA Zone A boundary, staff used these requirements as guidance for determining significance with respect to flooding of Tecopa Road and proposing mitigation to reduce impacts to less than significant. Inyo County Code defines adverse affects as cumulative effects that would increase water surface elevation of the base flood (the 100-year flood) more than one foot at any point. Therefore, staff considers a depth increase of up to one foot to be a less than significant impact for the 100-year storm. This in turn would result in less than one foot depth increase for all storms less than the 100-year event as shown in **Soils & Surface Water Table 7.**

Staff proposes Condition of Certification **SOILS-6** to reduce incremental flooding for storms up to the 100-year, 24-hour storm, to less than one foot. Condition of Certification **SOILS-6** (Perimeter Drainage Management Plan) requires the project to

reduce flooding impacts by increasing the amount of flows crossing the perimeter at Tecopa Road. This can be accomplished with appropriate storm water control structures, such as a drop inlet for large storm events, staggered landscape planting that allows better flow around the vegetation, or dry wells to increase infiltration.

It is important to note that estimates shown in **Soils & Surface Water Table 7** assume the proposed tortoise fence contains debris occupying 50 percent of the cross-sectional area. Further blockage of flows (as shown in **Soils & Surface Water Figure 11**) would result in the fence becoming more of a barrier rather than an impedance, which would further increase the flooding impacts to Tecopa Road. **SOILS-5** (Storm Water Damage Monitoring and Response Plan) would require maintenance and aggressive fence cleaning to reduce the amount of trapped vegetation and debris.

Increased Roadway Flows

The perimeter fencing and landscape screen would impede the naturally occurring floodplain flows from the Stump Springs area, causing a portion of the flow to concentrate at the perimeter and be diverted west along Tecopa Road. With an increase of flow volumes and velocities, the diverted runoff would impact the roadway shoulder and adjacent property west of the site (as depicted by the solid black arrows on **Soils & Surface Water Figure 11**).

The concentrated flows could potentially undercut the asphalt pavement edges and cause pavement damage at the roadway shoulder. Staff could not determine the project's incremental contribution to roadway shoulder damage because a baseline could not be established. Tecopa Road was constructed in the early 1970s and does not comply with current Inyo County geometric roadway design standards[24]. Inyo County's Road Department records the days a flood event occurred and whether road repairs were made to fix flood damage, but logs do not indicate what portion of Tecopa Road was impacted by the noted event (CEC 2012ii). Staff recognizes that flood damage occurs on Tecopa Road, but the extent of damage to the section of road adjacent to the proposed site cannot be determined. The concentrated flows could also erode the soil as it continues along the fence, then erode the adjacent property west of the site as it spreads at the west end of the site.

Staff proposes Condition of Certification **SOILS-6** (Perimeter Drainage Management Plan) that requires the project to increase the amount of flows crossing the perimeter which would, in turn, reduce the amount of redirected concentrated flow along the shoulder of Tecopa Road. Condition of Certification **SOILS-6** also requires the project to implement erosion control measures to protect the area adjacent to Tecopa Road and the area west of the site from erosion due to these concentrated flows. Also **SOILS-5** (Storm Water Damage Monitoring and Response Plan) would require maintenance of erosion control features and repair of damage from a storm event or other cause. Condition of Certification **TRANS-3** (Restoration of All Public Roads, Easements, and Rights-of-Way) would require the project to restore the public roads after project construction to compliance with the applicable jurisdiction's specifications (see the

[24] For further discussion on the structural integrity of Old Spanish Trail Highway/Tecopa Road, see "Total Construction Traffic" in the **TRAFFIC AND TRANSPORTATION** section of this **FSA**.

TRAFFIC AND TRANSPORTATION section of this **FSA**). This roadway restoration to current design standards would be an improvement above existing (baseline) Tecopa Road features and would help reduce damage from concentrated shoulder flows.

Offsite Linear Facilities

The proposed offsite linear facilities east of the proposed HHSEGS project would not alter existing offsite drainage patterns. The gas pipeline would be constructed underground, and the pole structures for the overhead power transmission lines would not impede or adversely redirect existing flows. Staff believes that offsite flooding impacts of the proposed Hidden Hills Transmission Project and proposed KRGT natural gas pipeline would be less than significant.

Vicinity Flood Hazards

Flood hazards include direct flooding due to overtopping of nearby rivers or streams resulting from severe rainstorms, or secondary flooding due to seismic activity creating tsunamis (tidal waves) or seiches (waves in inland bodies of water).

To identify the different types of flood risks for a given location, flood hazard maps were developed by the Federal Emergency Management Agency (FEMA) to identify areas prone to flooding[25]. Comparing the HHSEGS site location to these maps (see **Soils & Surface Water Figure 3**) and considering the site's elevation (2600 feet above mean sea level (msl)), staff found that:

- Although the north tip and southwest corner of the project footprint are located in areas designated at Zone A (100-year flood hazard area), neither of the power blocks or the administration complex are within these zones. Only heliostat poles and at-grade access roads would be placed in the designated 100-year flood zone, and neither would impede nor significantly redirect Zone A flood flows[26].
- HHSEGS site is located roughly 200 miles inland with no dams in the region. In addition, no levees or inland bodies of water are located in the area.

The proposed project would not impede or significantly redirect flood flows of the FEMA designated 100-year floodplain. In addition, the project would not be affected by dam failure, tsunami, or seiche. Staff agrees with the applicant that HHSEGS would not have significant impacts pertaining to these identified flood hazard areas. (For discussion on additional potential hazards that could be caused by soil failure such as mudflow, landslide and liquefaction, see the **GEOLOGY and PALEONTOLOGY** section of this **FSA**.)

Water Supply

Refer to the **WATER SUPPLY** section of this **FSA** for a detailed analysis of the potential effects on groundwater supplies and groundwater quality.

[25] For further discussion of FEMA and potential flooding, see Area Flooding under Local Setting heading above.

[26] The elevated portion of the west perimeter road is located between two Zone A boundaries, separated by more than 200 feet to the north and more than 2000 feet to the south.

Wastewater

Construction Wastewater

Improper handling or containment of construction wastewater could cause a broad dispersion of contaminants to soil, surface waters, or groundwater. For example, hydrostatic testing[27] of a new pipeline can result in discharge of super-chlorinated water often used for the initial disinfection. Other constituents of concern include total dissolved solids (TDS) and total suspended solids (TSS). Discharge of any non-hazardous construction-generated wastewater would require compliance with discharge regulations.

Anticipated sources of wastewater, also referred as non-storm water discharges, would be sanitary wastes, wash water, concrete washout water, paint wash water, and piping hydrostatic test water. Clean water used for dust control and soil compaction would not be considered wastewater because flows would not discharge offsite.

The applicant submitted a Preliminary Draft Construction DESCP/SWPPP (HHSG 2011a, App 5.15A) identifying a combination of standard BMPs for non-storm water management measures to be implemented during construction as well as corresponding Construction Phase BMP Plans showing their locations. Sanitary waste would be contained in portable facilities and routinely disposed of at an offsite treatment/disposal facility by a licensed sanitary service. Concrete washout slurries would be discharged to a temporary washout facility and allowed to dry prior to disposal offsite. The DESCP/SWPPP states that non-storm water discharges would be eliminated, controlled, or treated in accordance with the Construction General NPDES Permit requirements to minimize or eliminate the release of pollutants in storm water.

Staff agrees that implementation and maintenance of BMPs during construction would reduce or avoid impacts from concrete washouts and sanitary waste. Although compliance with Conditions of Certification **SOILS-1** and **-2** (DESCP and Construction SWPPP) would implement these and other standard BMPs, the BMP's planned for treatment of wash water are not specifically addressed in the DESCP/SWPPP. The Final DESCP and SWPPP must be revised to specifically include the appropriate BMPs for proposed management and ensure disposal of wash water during construction would not result in significant impacts.

The applicant stated in the AFC that hydrostatic test water (approximately 400,000 gallons total from both solar plants) would be discharged to the surrounding area or used for dust control if test results meet regulatory standards (HHSG 2011a, Table 5.14-3) Otherwise, the hydrostatic test water would be trucked offsite for disposal at an approved facility. In addition, the AFC states the same approach would occur for the passivating[28] and chemical cleaning fluid wastes (estimated to range from 200,000 to 400,000 gallons total from both solar plants) produced from pipe cleaning and flushing.

[27] A hydrostatic test is a way in which leaks can be found in pressure vessels such as pipelines and plumbing. The test involves placing water, which is often dyed for visibility, in the pipe or vessel at the required pressure to ensure that it will not leak or be damaged.

[28] Passivating fluid is used to treat or coat a metal pipe in order to reduce the chemical reactivity of its surface.

Discharge of hydrostatic test water to land is regulated under SWRCB Order No. 2003-003-DWQ which specifically prohibits the discharge of hydrostatic test water unless all residual pollutant concentrations comply with groundwater quality objectives. Discharge of hydrostatic test water to surface waters would be subject to provisions of Lahontan Regional Board Order No. R6T-2008-0023 (Revised Waste Discharge Requirements and NPDES General Permit for Limited Threat Discharges to Surface Waters).

In addition, potential contaminants in the discharge of other wastewater streams (anticipated wash water and passivating/chemical cleaning fluid wastes) may also be subject to other Lahontan RWQCB regulations to protect water quality. Because more information is needed describing the management and disposal methods of wash water and pipe water discharges not meeting SWRCB and/or Lahontan RWQCB requirements, staff cannot determine whether these wastewater streams would result in significant impacts during construction. To ensure HHSEGS would sufficiently address these wastes, staff recommends Condition of Certification **SOILS-7** (Construction Wastewater Discharge) requiring the project owner to obtain the appropriate permit(s) from Lahontan RWQCB and/or the SWRCB for reuse onsite as dust control. If the wastewater discharge does not meet the requirements for reuse, then the project owner must submit proof of proper wastewater disposal, in accordance with waste discharge requirements of the Clean Water Act (CWA). Adoption of Condition of Certification **SOILS-7**, in addition to a complete and approved DESCP and Construction SWPPP as required in Conditions of Certification **SOILS-1** and **-2**, would reduce potential impacts from proposed management and disposal of wastewater during construction to a less than significant level.

Operations Wastewater

A thermal evaporator system would process the wastewater. Generally speaking, heat is applied to recirculating wastewater causing water to vaporize, producing a high quality distillate for reuse, and leaves behind virtually all the unwanted contaminants in a concentrated solute for disposal. HHSEGS would return approximately 90 percent of the operations wastewater for reuse back into the service water tank. The applicant states in the AFC that reject from the thermal evaporator would be trucked offsite for treatment or disposal at an approved facility.

To ensure protection of water quality from waste disposal, the SWRCB establishes specific requirements including a system to classify waste, according to the risk of impairment to water quality, as well as standards and regulations for proper disposal. For example, “hazardous waste” disposal is only accepted at a Class I disposal site and a “designated waste” at a Class II disposal site, while wastewater discharge would typically occur at a wastewater treatment facility.

Staff proposes Condition of Certification **SOILS-8** (Wastewater Collection System) requiring the project owner to submit proof of proper wastewater disposal, in accordance with waste discharge requirements of the Clean Water Act (CWA). Adoption of Condition of Certification **SOILS-8** would reduce potential impacts from proposed management and disposal of process wastewater during operations to a less than significant level.

Sanitary Wastewater

As noted previously, the HHSEGS project would require a septic system and leach field at each of the two power blocks and the administration complex. Each of the systems would be designed to treat up to 700 gallons per day of wastewater discharged from toilets, sinks, and showers. Septic tanks would be pumped out as needed by a qualified sanitary service provider.

The use of septic tanks and leach fields for onsite treatment and disposal of domestic wastes is an established practice. However, improper construction and operation of these systems may adversely impact nearby surface and ground waters. To ensure protection of human health and the environment from improper disposal of sewage, California Plumbing Code and Lahontan RWQCB establishes specific requirements for the discharge of sewage. Included in the requirements are soil percolation standards; minimum separation/set back distances to prevent impacts to groundwater and nearby water wells; and septic tank and leach field design, sizing and construction standards to ensure adequate capacity and proper treatment and disposal of the wastewaters. The Inyo County Environmental Health Services Department (ICEHSD) is responsible for permitting and requires persons constructing septic systems to apply for a permit for the construction and operation of the system.

Consistent with the Energy Commission's in-lieu permit provisions, staff proposes adoption of Condition of Certification **SOILS-9** (Septic System and Leach Field Requirements) requiring compliance with the requirements of the Inyo County Code (Title 7, Section 7.52.060), the California Plumbing Code (California Code of Regulations Title 24, Part 5), and the Lahontan RWQCB Basin Plan for all project sanitary waste disposal facilities, such as septic systems and leach fields. Adoption of Condition of Certification **SOILS-9** would both ensure compliance with LORS and, through the protectiveness provided by the County regulatory standards, reduce potential impacts from project septic systems to a less than significant level.

INDIRECT IMPACTS

Indirect impacts are effects caused by the project and occurring later in time or farther removed in distance, but still reasonably foreseeable. Indirect impacts usually result from a chain of events caused by the project, intended or not.

Soil Erosion and Surface Water Quality

With any new project, possible indirect impacts affecting soil and water resources would be in response to additional construction activities. For example, additional housing could be needed to accommodate workers for construction and operation of a proposed project, or additional industrial facilities may be attracted to an area containing an established solar facility. These in turn can further result in additional roads or other infrastructure. Potential impacts of these various resultant activities would be similar to the potential direct impacts of the project itself such as: potential erosion due to construction activities, potential flooding impacts due to structures within a 100-year flood zone or increase of impervious surfaces, potential contamination from industrial activities, and potential impacts from wastewater.

The **SOCIOECONOMICS** section of this **FSA** discusses growth-inducing impacts, and concludes that the project's construction and operation workforces would not induce a substantial population growth or displacement of population, or induce substantial increases in demand for housing. The **GROWTH INDUCING IMPACTS** section of this **FSA** concludes that neither the project's gas pipeline nor the electricity generated by the HHSEGS would induce any additional growth in the project area. The scarcity of local groundwater resources and the existing land use designations are serious constraints to any significant economic development in the project area. Based on this information, staff believes the HHSEGS project would not indirectly result in significant impacts to soil resources or surface water quality.

Water Supply and Groundwater Quality

Refer to the **WATER SUPPLY** section of this **FSA** for a detailed analysis of the potential effects on groundwater supplies and groundwater quality.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of reasonably foreseeable future projects (California Code of Regulations, Title 14, section 15130). The construction and operation activities of the various projects could potentially overlap and result in cumulative impacts to the same resource(s).

Soil Erosion and Surface Water Quality

The project site is in Inyo County, along the California and Nevada border. **Soils & Surface Water Table 8** lists the projects in the vicinity of the proposed HHSEGS site that have been approved or are under review. These specific projects were considered for the HHSEGS cumulative impacts to water quality and hydrology because of their location within the Pahrump Valley. **Soils & Surface Water Figure 13** (also see **Cumulative Effects Figure 2**) displays the project locations on a map in relation to the proposed HHSEGS site.

Soils & Surface Water Table 8
Projects Reviewed for Cumulative Impacts

Map ID	Project Name (Agency ID#)	Location	Ownership	Status	Project Description
A	St. Therese Mission	Tecopa Road near Charleston View	Magnificat Ventures Corp, Las Vegas NV	Inyo County approved project June 2011	17.5 acre environmental park, memorial and internment center
B	Pahrump Valley General Aviation Airport	Pahrump, NV (~ 10 miles northwest of HHSEGS site)	Nye County	Environmental review phase (const may overlap with HHSEGS const)	Public-use general aviation airport on 650 acres of BLM land
C	Element Solar (NVN 089655)	Pahrump Valley (6.5 miles northeast of HHSEGS site)	First Solar Development	POD submitted[1]	100 MW photovoltaic project with 2,560 acres of BLM land requested

Map ID	Project Name (Agency ID#)	Location	Ownership	Status	Project Description
H	Sandy Valley (NVN 090476)	Clark County, NV (~8 miles southeast of HHSEGS site)	BrightSource Energy Solar Partners	POD submitted[1]	750 MW renewable energy project with 15,190 acres of BLM land requested
N	Hidden Hills Valley Electric Transmission Project (NVN 089669)	Mainly in Clark County, NV (direct service to HHSEGS site)	Valley Electric Association	Environmental review phase (DEIS expected late December, 2012)	Transmission and natural gas pipeline alignments. This is a "connected action" to the proposed HHSEGS project.

Note 1: The Plan of Development (POD) includes basic project information needed to initiate the environmental analysis and review process with the Bureau of Land Management (BLM). This step occurs prior to publication of a Notice of Intent to prepare an Environmental Impact Statement.

These projects have the potential to increase local soil erosion and storm water runoff. Without the use of storm water BMPs and erosion control BMPs, these changes could incrementally increase local soil erosion and storm water runoff leading to significant impacts to the quality of Pahrump Valley's surface waters. By complying with all applicable erosion and storm water management LORS, including the Water Quality Control Plan for the Lahontan Region (Basin Plan) in California and applicable requirements of the Nevada Division of Environmental Protection's regulatory agencies, the proposed HHSEGS project would not contribute to a potentially significant cumulative impact[29].

Offsite Flooding

Staff considered the effects of the St. Therese Mission project to analyze cumulative offsite flooding because it is located on the same alluvial fan area as the HHSEGS site and is also bordered by Tecopa Road (as shown on **Soils & Surface Water Figure 13**). In addition, St. Therese Mission includes a perimeter fence and landscaping along its border adjacent to Tecopa Road similar to HHSEGS. As discussed in Direct Impacts above (Offsite Area Flooding: Impediments to Existing Flow Conditions), the fencing and landscaping could potentially flood Tecopa Road and increase storm water flows along the roadway shoulder. The relatively close proximity of the two projects has the potential of combining impacts to further exacerbate flooding and erosive flows.

Staff found that St. Therese Mission is located on a portion of the alluvial fan that avoids floodplain flows from the Stump Springs area (see **Soils & Surface Water Figure 3**). Therefore, its perimeter fence and landscaping do not encounter the large flows that would result in significant flooding to Tecopa Road as would the HHSEGS site. Based on this information, staff does not believe that the effects of the two projects would combine to cumulatively result in Tecopa Road flooding worse than potential flooding caused by the HHSEGS project alone. In other words, mitigated impacts from Condition

[29] CEQA also allows the lead agency to determine that a project's contribution to a cumulative impact is not significant "if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem … within the geographic area in which the project is located." (California Code of Regulations, Title 14, section 15064(h)(3)).

of Certification **SOILS-6** (intended to reduce potential Tecopa Road flooding) would not contribute to a significantly cumulative impact.

Water Supply and Groundwater Quality

Refer to the **WATER SUPPLY** section of this **FSA** for a detailed analysis of the potential cumulative effects on groundwater supplies and groundwater quality.

COMPLIANCE WITH LORS AND STATE POLICY

CLEAN WATER ACT, ANTIDEGRADATION POLICY, PORTER-COLOGNE WATER QUALITY CONTROL ACT, AND SWRCB ORDERS 2009-0009-DWQ, 2003-003-DWQ, AND 97-03-DWQ

The Clean Water Act (CWA) (33 USC, section 1257 et seq.) requires states to set standards to protect water quality, which include regulations of storm water and wastewater discharge during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act. The SWRCB regulates storm water discharges associated with construction of projects affecting areas greater than or equal to 1 acre. Under Order 2009-0009-DWQ, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity, Order 2003-03-DWQ is for water discharges to land that has a low threat to water quality (includes water from hydrostatic testing of pipes), and Order 97-03-DWQ is for storm water discharges associated with industrial activity. Projects qualify under these permits if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.

The HHSEGS would satisfy these requirements of the SWRCB and Lahontan RWQCB with the development of a DESCP in accordance with Condition of Certification **SOILS-1**, the development of construction SWPPPs in accordance with Condition of Certification **SOILS-2**, compliance with requirements for hydrostatic test water discharge in accordance with Condition of Certification **SOILS-7**, and the development of industrial SWPPPs in accordance with Conditions of Certification **SOILS-3** and **-4**. In addition, proposed Condition of Certification **SOILS-5** would reduce potential impacts from damaging storm events.

CALIFORNIA CODE OF REGULATIONS TITLE 20, DIVISION 2, CHAPTER 3, ARTICLE 1

These data collection regulations known as Quarterly Fuel and Energy Reports (QFER) are to obtain necessary information in order for the California Energy Commission to develop policy reports and analyses related to energy. Power plant owners are required to periodically report specific operational data to the California Energy Commission, including water supply and water discharge information. Through compliance with Condition of Certification **SOILS-8** (Wastewater Collection System), HHSEGS would provide the required data for wastewater disposal.

INYO COUNTY GENERAL PLAN AND RENEWABLE ENERGY ORDINANCE

The Inyo County General Plan lists Water Resources goals and policies, which include Policy WR-1.4 that new industrial developments reducing polluted runoff from entering surface waters by complying with the Clean Water Act, reducing direct-source pollution into surface waters, and implementing appropriate mechanisms to reduce wastewater discharge. The General Plan also identifies goals for Public Services and Utilities, including Wastewater goals (PSU-4) which ensure adequate wastewater collection, treatment, and disposal; and Stormwater Drainage goals (PSU-5) which include polices that new project design and maintenance activities improve runoff quality and encourage use of natural stormwater drainage systems.

Title 21 of the Inyo County Code (Renewable Energy Ordinance) encourages and regulates the development of renewable energy resources within Inyo County. The ordinance requires developers of solar thermal, photovoltaic, and wind energy power plants to protect the health, safety, and welfare of the County's citizens, the County's environment, and to ensure the County and its citizens do not bear an undue financial burden from the project. Under this ordinance, a proposed project must implement necessary mitigation measures by obtaining a renewable energy permit, a renewable energy development agreement, or a renewable energy impact determination. Furthermore, this ordinance requires compliance with the Inyo County General Plan.

Although compliance with **SOILS-1** through **-9** would reduce polluted runoff from entering surface waters, staff believes that HHSEGS does not specifically reduce direct-source discharge. As discussed in "Onsite Area Flooding" above, an onsite retention area would accumulate runoff from a majority of the HHSEGS site along the west perimeter road before discharge offsite. However as discussed in "Water Quality of Surface Waters" above, staff does not identify any significant impacts to water quality as a result of the retention area provided staff recommended mitigation measures are implemented.

SWRCB RES. 2008-0030 (LOW IMPACT DEVELOPMENT)

SWRCB and Lahontan RWQCB encourage a low-impact planning approach for new development projects. Low Impact Development (LID) is an alternative management approach to the traditional "end-of-pipe" centralized collection and treatment approach of simply collecting onsite runoff flows in order to control offsite discharge through a single discharge point. Although the post construction peak discharge rate matches the preconstruction rate, the post construction flows are typically sustained for a longer period of time which increases the volume of runoff during a given rain event. This can increase the amount of pollutants and the erosive energy of discharge.

LID focuses on an integrated system of decentralized, small-scale control measures spread throughout the site. By distributing storm water rather than concentrating it, the erosive forces of this runoff can be avoided. LID features often take advantage of soil infiltration, vegetation, and evaporation to mimic the natural hydrologic regime. Examples of measures include:

- Reducing imperviousness, conserving natural resources and ecosystems, maintaining natural drainage courses, reducing use of pipes, and minimizing clearing and grading.
- Providing runoff storage measures dispersed uniformly throughout a site's landscape with the use of a variety of detention, retention, and runoff practices.
- Maintaining predevelopment time of concentration[30] by strategically routing flows, increasing surface roughness, and disconnecting[31] impervious surfaces to maintain travel time and control the discharge.

However, LID measures may not be suitable for all sites, with considerations made to expected rainfall intensities, climate (i.e., relative humidity, solar radiation, air temperature, wind speed) and, in particular, soil permeability. Also, LID by itself may not completely replace the need for conventional storm water controls to mitigate excess flow rates or to provide enhanced storm water treatment.

The proposed HHSEGS site appears suitable for implementation of LID measures, based on the dry hot climate and sandy native soils. The applicant submitted a Preliminary Draft DESCP which contains the following measures:

- Vegetation would not be removed but would be mowed (if needed) in areas where grading is not required for access or construction.
- Most of the natural drainage features would be maintained and any grading required would be designed to promote sheet flow where possible.
- Relatively small rock filters and local diversion berms through the heliostat fields to discourage water from concentrating.
- Areas compacted during construction activities would be restored, as appropriate, to approximate preconstruction compaction levels.
- Heliostat assemblies, which contribute to the project's total impervious area, would be installed such that their surface runoff flows to the pervious dirt areas of the solar field.

Staff believes that implementation of the above measures, which would be approved by staff in accordance with Condition of Certification **SOILS-1**, sufficiently complies with this SWRCB policy. Although the applicant does not specifically demonstrate that all components of LID are met, namely the objective of maintaining preconstruction runoff volume, the above measures would help reduce the increase in volume. Furthermore, neither Inyo County nor Lahontan RWQCB requires minimum standards for use of LID practices for this area.

[30] The time of concentration refers to the amount of time it takes for water to travel from a watershed's most distant point to the watershed's outlet. Maintaining storm water's natural time of concentration allows the water to slowly permeate into the ground.

[31] The impacts of disconnected impervious surfaces are considerably less severe than a contiguous stretch of impervious area.

FACILITY CLOSURE

HHSEGS is designed for an operating life of 25 to 30 years (HHSG 2011a, § 2.3.2.1). Facility closure can be either temporary or permanent, and closure options range from "unplanned temporary closure," with the intent of a restart at some time, to the removal of all equipment and facilities. Closure can result from two circumstances: (1) the facility is closed suddenly and/or unexpectedly because of unplanned events, such as a natural disaster or economic forces or (2) the facility is closed in a planned, orderly manner, such as at the end of its useful economic or mechanical life or due to gradual obsolescence.

In the event of a temporary or unplanned closure, HHSEGS would be required to comply with all applicable conditions of certification, including an emergency Risk Management Plan to manage the possible release of hazardous substances present onsite (see the **HAZARDOUS MATERIALS** section of this **FSA**). Depending on the expected duration of the shutdown, other appropriate measures would be taken such as removing chemicals from storage tanks or equipment.

Permanent closure (decommissioning) requires a Facility Closure Plan, as discussed in the **FACILITY DESIGN** and **GENERAL CONDITIONS** sections of this **FSA,** which would be submitted to the Energy Commission for approval prior to decommissioning. Future conditions that could affect decommissioning are largely unknown at this time, however compliance with all applicable LORS, and any local and/or regional plans would be required. The plan would address all concerns in regard to potential erosion and impacts on water quality. Refer to the **FACILITY DESIGN** section of this **FSA** for further discussion on temporary and permanent facility closure.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff published the Preliminary Staff Assessment ([PSA], CEC 2012u) on May 24, 2012. The table below contains staff's responses to comments received pertinent to topics addressed in this section. The comments were submitted by:

- Agency - Inyo County (INYO 2012j)
- Agency - Bureau of Land Management (BLM 2012b)
- Intervenor - Cindy MacDonald (MAC 2012c)
- Applicant – Hidden Hills Solar I, LLC; and Hidden Hills Solar II, LLC (CH2 2012ee)

Comment #	COMMENT and RESPONSE
1	**Inyo County**
1.79 Pg 12: Consistency with General Plan	COMMENT: Goal PSU-4/Wastewater: To ensure adequate wastewater collection, treatment, and disposal. Consistency: Compliant. The project proposes adequate wastewater management for the project site. Identified by PSA as LORS?: No.

Comment #	COMMENT and RESPONSE
	Goal PSU-5/Stormwater Drainage: To collect and dispose of stormwater in a manner that minimized inconvenience to the public, minimizes potential water-related damage, and enhances the environment Consistency: Compliant. The project proposes adequate stormwater drainage for the project site. Identified by PSA as LORS?: No. RESPONSE: Text added identifying PSU-4 and PSU-5 in the Inyo County LORS. See page 45.
2	**Bureau of Land Management**
2.3 Pg. 2: Soils & Surface Water	COMMENT: An assumption is made in Table 6 (page 4.10-12) of the PSA that there will be negligible soil disturbance throughout the heliostat field. Soil disturbance is a direct result of the installation of solar cells or mirrors and, to date, all technologies require some level of disturbance. Ground disturbance can occur even in relatively level areas. RESPONSE: In the construction industry, disturbed area or soil disturbance area typically means an area that is altered as a result of clearing, grading, and/or excavation. Staff use of "negligible" in describing heliostat installation in the field (vehicle driving, vegetation mowing, and foot traffic) reflected that no grading would be required. Staff changed the description to “Area of Land Grading and Excavation” to avoid confusion. See Total Soil Disturbance discussion in the **Soils & Surface Water** section on page 15.
2.4 Pg. 2: Soils & Surface Water	COMMENT: Neither the applicant's plan of development nor the PSA's proposed SOILS-5 condition of certification address the possibility that flow across the roadway may cause this berm to fail, nor do they address any potential impacts of the resulting offsite flooding and scour. SOILS-5 does not require the berm to be stabilized with riprap, gunite, or similar material that would prevent piping around the 18-inch culvert that would be the sole drainage point. Armoring the key points in this berm will be necessary to minimize risk to offsite soil resources. Alternatively, the applicant may choose not to install a berm along the western perimeter and simply allow floodwaters to pass through the heliostat field unimpaired, although this may result in heliostat being damaged or washed away. RESPONSE:

Comment #	COMMENT and RESPONSE
	Included language in **SOILS-5** on page 88 about protection and damage to the west perimeter road. See discussion on page 32.
10	**Intervenor - Cindy MacDonald SOILS & SURFACE WATERS**
10.1	COMMENT: (p.14-1 #1) Why should the public believe the CEC and applicant would "*ensure all appropriate environmental review has been completed*" at any other stage of the proposed project if they won't even do it now? <u>RESPONSE:</u> The entire sentence reads as follows: "For activities outside of the project boundaries the owner shall ensure all appropriate environmental review and approval has been completed before field activities begin." Activities outside the project boundaries do not fall within Energy Commission jurisdiction. Compliance staff would enforce Energy Commission conditions of certification as well as work with local agencies should an issue develop outside the project boundaries.
10.2 10.3 10.4	COMMENT 10.2: (p.14-1 #2) How does it serve the public interest to develop and analyze data regarding potentially significant impacts of the proposed project only after the proposed project is approved? COMMENT 10.3: (p.14-2 #3) How are "mitigation measures" reducing the project's impacts and meeting CEQA requirements if those impacts aren't even disclosed, analyzed or vetted until after the proposed project is approved? COMMENT 10.4: (p.14-2 #4) If only general and superficial data and/or analysis are substituted for site-specific data and critical analysis, how can the proposed project site be credibly deemed "suitable" or "feasible"? <u>RESPONSE TO ALL:</u> The proposed project is defined in the AFC and during Discovery. Staff analyzes the project, identifies impacts and evaluates feasible mitigation measures in the PSA and FSA, to provide an independent recommendation to the Commissioners. The Commissioners use the evidentiary record, augmented by analyses from the applicant and interveners, and hearings, to render a decision on the proposed project.
10.5	COMMENT 10.5: (p.14-6 #1) Why didn't the CEC Staff address the issues associated with potential soil unsuitability at the proposed project site in the Preliminary Staff

Comment #	COMMENT and RESPONSE
10.6	Assessment as outlined in the Preliminary Geotechnical Report? COMMENT 10.6: (p.14-6 #2) Given the potential gravity of the lack of site suitability or the possibility that the proposed project may be infeasible based on the findings of the Preliminary Geotechnical Report, why wouldn't the applicant INSIST on obtaining a Final Geotechnical Report before moving forward with the AFC process or at any time since? <u>RESPONSE TO ALL:</u> Staff does not agree with the commenter's statement about "the lack of site suitability or the possibility that the proposed project may be infeasible based on the findings of the Preliminary Geotechnical Report". The Preliminary Geotechnical Report concluded that "there are no known geotechnical or geologic conditions that would preclude development of the proposed project at the subject site". After further analysis, staff made a similar determination concluding that the project (as mitigated) would not result in significant geologic impacts. (See the **Geology and Paleontology** section of this **FSA**.)
10.7 10.8	COMMENT 10.7: (p.14-6 #3) Since heliostat assembly's are structures and the Preliminary Geotechnical Report warned that "surface runoff should…..not [be] permitted to flow or infiltrate….beneath structures", what is going to happen to the thousands of heliostats that will be positioned in the South, Southwest and Western portions of the project site that are in an acknowledged flood zone and subjected to high intensity stormwater and surface runoff? COMMENT 10.8: (p.14-6 #4) Since the Preliminary Geotechnical Report warned of soils with "high collapse potential" as is clearly illustrated by the photo of the van, what is going to be the reality behind the applicant's "fool proof" highly advanced computer controlled "Glint and Glare Heliostat Positioning Plan" when the heliostat's shift and sink just as the van did due to water infiltration causing soil collapse? <u>RESPONSE TO ALL:</u> The "structures" discussed in the geotechnical report are those with elements of horizontal construction, such as concrete slabs-on-grade, exterior concrete flatwork, and pavement sections (like roads and parking lots). The heliostat foundations are 6 inch diameter rods (pylons) driven at least 10 feet into the ground. The design of the heliostat foundation will not allow flow or infiltration of runoff beneath the pylon. The AFC states that earthwork within the power blocks and common

Comment #	COMMENT and RESPONSE
	area would be "excavated and compacted to the recommendations of the associated geotechnical report" (AFC Section 2.4.1.1). This would remove the unsuitable soil and replace with suitable soil to create a stable layer, per California Building Code requirements and proposed conditions of certification **GEN-1**, **GEN-5** and **CIVIL-**1 discussed in the **Facility Design** section of this **FSA**. Expansive soils do not present the same challenges for pylons because amount of material exposed to the swelling/shrinking soils at the surface is much smaller than a concrete building. The bigger risks to heliostats are above ground forces from water and wind. **SOILS-5** requires heliostat stability and includes a monitoring plan that inspects for heliostat and mirror damage. Staff included in **SOILS-5** (page 87) a requirement to also test pylon stabilization with saturated soil and standing water.
10.9	COMMENT: (p.14-6 #5) If heliostat assemblies shift, sink and/or collapse due to a rain event, how will this impact the heliostat's ability to transfer energy/heat to the power towers and the "renewable" portion of the proposed projects energy production? <u>RESPONSE:</u> **SOILS-5** would implement a plan to reduce storm water impacts by establishing specifications for heliostat installation based on site specific studies and reports. This ensures that heliostats are designed to withstand a 100-year storm event.
10.10	COMMENT: (p.14-9 #1) Given the fact that the CEC Staff has already identified that the location of the proposed project site near the bottom of an alluvial fan system may result in “significant” impacts, why have they not pursued developing modeling of impacts during the CEQA equivalency process to determine site suitability and project feasibility? <u>RESPONSE:</u> Site suitability and project feasibility was address in the **Geology and Paleontology** section of this **FSA**. Assessment of geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, seiches, and others as may be dictated by site-specific conditions. The Preliminary Geotechnical Report concluded that "there are no known geotechnical or geologic conditions that would preclude development of the proposed project at the subject site". After further analysis, staff made a similar determination concluding that the project (as mitigated) would not result in significant geologic impacts. (See the **Geology and Paleontology** section of this **FSA**.)

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10.11 10.12	COMMENT 10.11: (p.14-9 #2) How is the modeling of potential storm water impacts to the proposed project site *after* the project's approval considered a mitigation measure that reduces project impacts? COMMENT 10.12: (p.14-9 #3) How can the current approach taken by the CEC Staff to determine potential impacts and develop mitigation measures to protect the environment from storm water impacts only *after* project approval be defined as "conservative" or meet CEQA equivalency standards? <u>RESPONSE TO ALL:</u> The Post Construction Hydrologic & Hydraulic Analysis (modeling) submitted with the AFC was needed for evaluation and review of potential environmental impacts that may result from implementation of the proposed project. The analysis was based on a preliminary design of the project, which is sufficient for staff to determine if potential impacts are mitigable. Should the project be approved, a revised analysis must be submitted to reflect the project final design, including mitigation measures.
10.13	COMMENT: (p.14-9 #4) Could modeling of site-specific storm water impacts also yield a potential "catastrophic" conclusion such as the Ivanpah site modeling results did? Could impacts be even greater at the Hidden Hills site? <u>RESPONSE:</u> Staff reviewed the applicant's pre- and post-construction hydrology analyses (modeling) and then compared the results to Ivanpah's hydrology analysis. The Ivanpah project site contains significantly steeper terrain: some channels are more than five feet deep with many more that are one to two feet deep, and modeled post-construction flow velocities reached over 5 feet/second across large areas of braided flow zones. The Hidden Hills site contains one channel that measured 1.6 feet deep with the remaining measured 0.6 foot or less. When post-construction flow velocities were modeled, highest velocities (over 5 feet/second) occurred in the largest channel for approximately 200 feet length. Braided flow zones reached up to 3 feet/second.
10.14	COMMENT 10.14: (p.14-9 #5) What if the site-specific storm water modeling impacts reveals the HHSEGS project site is unsuitable for the proposed project but it has already been approved? COMMENT 10.15: (p.14-9 #6)

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10.15	Does it matter if site-specific storm water modeling reveals the HHSEGS project site is not suitable or feasible and cannot be reasonably mitigated because project approval is already a foregone conclusion, regardless of its impacts to the environment? <u>RESPONSE TO ALL:</u> Staff did not find that the site is unsuitable for the proposed project, based on the pre- and post-construction hydrology analyses (modeling) as well as the preliminary geotechnical report. Staff believes the preliminary studies are adequate to identify whether there are any potentially significant impacts from storm water flows in accordance with CEQA requirements. Through the proposed conditions of certification staff will ensure the final designs incorporate the measures necessary to ensure there are no significant impacts.
10.16	COMMENT: (p.14-12 #1) Despite Staff acknowledging the potentially significant environmental impacts of the heliostats/mirrors in relation to generally known site-specific issues, why hasn't Staff or the applicant developed any of the aforementioned reports to insure project site suitability, feasibility and reasonably foreseeable environmental impacts, degradation and/or damage? <u>RESPONSE:</u> The Pre- and Post-Construction Hydrologic & Hydraulic Analyses (modeling) submitted with the AFC were adequate for evaluation and review of potential environmental impacts that may result from implementation of the proposed project. Staff believes the preliminary studies are adequate to identify whether there are any potentially significant impacts from storm water flows in accordance with CEQA requirements. Through the proposed conditions of certification staff will ensure the final designs incorporate the measures necessary to ensure there are no significant impacts.
10.17 10.18 10.19	COMMENT 10.17: (p.14-12 #2) Specifically, how many heliostats/mirrors structures would have to be impacted by storm water inundation, flooding and/or standing water to be considered potentially significant? Significant? 100? 1,000? 10,000? 100,000? COMMENT 10.18: (p.14-12 #3) What is number of heliostats/mirror structures impacted by storm water inundation, flooding and/or standing water that would render a determination of unmitigatable impacts to the proposed project site? COMMENT 10.19: (p.14-13 #4) How many heliostat/mirrors could be potentially carried offsite due to

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	a significant storm event before they were deemed a significant adverse impact to the environment and surrounding property owners?
10.20	COMMENT 10.20: (p.14-13 #5) How much broken glass could be littered around the site before those impacts would be deemed potentially significant or significant? 100 lbs? 1,000 lbs? 10,000 lbs? 100,000 lbs?
10.21	COMMENT 10.21: (p.14-13 #6) How much broken mirror glass could potentially be carried offsite before it would be deemed a significant adverse impact to the environment and surrounding property owners? 100 lbs? 1,000 lbs? 10,000 lbs? 100,000 lbs?
	<u>RESPONSE TO ALL:</u> Impacts from storm water inundation, flooding, and/or standing water is typically in terms of the potential to cause injuries to people or property damage to buildings. If heliostats are not damaged from standing water, then no heliostats are impacted. A CEQA impact would occur if a damaged heliostat releases a contaminant into the standing water. No numerical threshold is established for specific number of heliostats for determining significance. The Lahontan Basin plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. (The following have been identified for the Pahrump Valley: Ammonia; Bacteria, Coliform; Biostimulatory Substances; Chemical Constituents; Total Residual Chlorine ; Color; Dissolved Oxygen; Floating Materials; Oil and Grease; Non-degradation of Aquatic Communities and Populations; Pesticides; pH; Radioactivity; Sediment; Settleable Materials; Suspended Materials; Taste and Odor; Temperature; Toxicity; Turbidity.) **SOILS-5** would implement a plan to reduce storm water impacts from damaged heliostats in four ways: 1. Establish specifications for heliostat installation based on site specific studies and reports. This ensures that heliostats are designed to withstand storm water scour of a 100-year storm event. 2. Establish an ongoing maintenance plan to ensure all storm water management measures are functioning properly, though periodic inspection before the first seasonal storms and after each storm event throughout the year. 3. Establish and implement a response plan to implement after every occurrence of damage (from a storm event or other cause) to clean up damage and prevent release of sediment or pollutants. 4. Develop and implement a process to monitor incidents and propose modifications and/or improvements to address ongoing issues.

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	See **SOILS-5** language on page 88 and discussion on page 32.
10.22	COMMENT: (p.14-13 #7) Given the fact that Staff already projects broken mirrors and mirror shards will be an inseparable part of the proposed project, who has analyzed the potential glint and glare impacts of this debris - either in the heliostat assemblies or dispersed throughout the landscape - in relation to motorists, recreational viewers, and local residents? RESPONSE: Staff does not consider mirror shards to be an inseparable part of the proposed project. Instead, the goal of **SOILS-5** is to prevent mirror shards as much as possible. Should mirror damage occur, **SOILS-5** requires clean up. The perimeter screening/fencing in **VIS-2** would also reduce impacts to motorists, recreational viewers, and local residents. For additional discussion on Glint and Glare, please refer to the **Traffic and Transportation** section of this **FSA**.
10.23	COMMENT: (p.14-17 #1) Did Staff make an error in estimating impervious surfaces from heliostat/mirror assemblies or have design changes increased the number of heliostat/mirror assemblies on the proposed site? RESPONSE: The discrepancy in amount of impervious area from heliostats (806 acres vs. 851 acres) was a typo. The correct amount is 806 acres, as shown in Table 6. The estimate of 851 acres includes all impervious areas, not just the heliostats. See page 30. The commenter is incorrect in stating that the project site is currently 25 percent impervious simply because the native soil composition contains 25 percent high runoff potential components (Hydrologic Soil Group D). Impervious surfaces prevent the infiltration of water into the soil. These areas are mainly artificial structures such as pavements (roads, sidewalks, driveways and parking lots) and rooftops. Existing conditions on the proposed project site contain zero percent impervious area.
10.24	COMMENT: (p.14-17 #2) Based on historical experience in the area, it is probable that the highest concentration of clay and clay like soils will most likely be located in the South, Southwest and West end of the proposed project site. If this turns out to be the case as a result of the Final Geotechnical Report, what differences will this make (if any) to offsite flooding in this area? RESPONSE:

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	Using a preapproved hydrologic analysis methodology, the applicant analyzed storm water runoff of the site for both pre-construction and post-construction scenarios. Although soil type at the site is a definite factor, the flooding is largely contributed to increasing impervious area and modifications to the naturally occurring drainage patterns.
10.25	COMMENT: (p.14-17 #3) What evidence and/or data is available that supports the estimated soil disturbance acreage, impervious surface acreage and where is it located in the AFC files or subsequent documents? <u>RESPONSE:</u> Soil disturbance acreage information is found in Appendix C of Post Construction Hydrologic & Hydraulic Analysis (Road construction, large laydown construction area) and Attachment I of Construction DESCP/SWPPP (laydown areas at each solar plant site). Staff use of "negligible" soil disturbance in describing heliostat installation in the field (vehicle driving, vegetation mowing, and foot traffic) reflected that no grading would be required. Staff changed the description from “Soil Disturbance Area” to “Area of Land Grading and Excavation” to avoid confusion. Please see **Soils & Surface Water Table 6** on page 15. Impervious surface acreage information from: Appendix C of Post Construction Hydrologic & Hydraulic Analysis (heliostats, paved roads, buildings, powerblocks)
10.26 10.27	COMMENT 10.26: (p.14-18 #4) What is the accurate design element for the roads that will circle the power towers; the 20 ft. drive zones or the 10 ft. maintenance paths? COMMENT 10.27: (p.14-18 #5) What is the difference in total affected acreage between these two design elements for the drive zones versus the maintenance paths? <u>RESPONSE TO ALL:</u> Because the applicant's post-construction calculations used 10-foot wide concentric drive zones around each solar tower, staff considers this to be the intended design. Staff did not assess the project using 20-foot wide concentric drive zones because the post-construction calculations indicated 10-foot wide roads and not 20-foot wide roads. Paved roads: 16 acres Fully graded dirt roads (12' & 20'): 18.2 acres Partially graded dirt roads (10'): 171 acres

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10.28	COMMENT: (p.14-18 #6) If chemical dust suppressants are used to control fugitive dust over the life of the project, shouldn't the impervious surfaces they create be included in the impervious surface evaluations? RESPONSE: Yes. The Post Construction Hydrologic and Hydraulic Analysis used the assumption that the 10' partially graded dirt roads are compacted, rather than impervious. If the chemical dust suppressant used for these road results in impervious areas, then an updated report is required for **SOILS-5**. See discussion on page 33.
10.29	COMMENT: (p.14-18 #7) If the applicant and/or CEC CPM approve the use of Pennz-Suppress D for dust suppression over the life of the project, what potential impacts will this product have to water, water quality and biological resources in and around the proposed project site? RESPONSE: Should the proposed project be approved, the CPM would consult with technical staff (air, water, and biological resources) prior to approving a particular dust suppression product. This verification is included in Air Quality section Conditions of Certification **AQ-SC3** (Construction Fugitive Dust Control) and **AQ-SC7** (Operation Dust Control Plan).
10.30	COMMENT: (p.14-18 #8) Gravel surfaces and roads in the area have proven to be reasonably effective in slowing storm water runoff, ponding and structure collapse. Given its advantages in the area, would the CEC Staff recommend the drive zone/maintenance paths be surfaced with gravel to reduce impervious surfaces between the heliostat fields as well as reducing potential impacts for onsite and offsite flooding? RESPONSE: Staff recognizes gravel as an effective means of erosion control of disturbed soil. It is an approved BMP under "Non-Vegetative Stabilization" (Fact Sheet EC-16 of California Stormwater BMP Handbook, www.casqa.org). Depending on the final designs for drainage management staff may require use of this BMP.
10.31	COMMENT: (p.14-18 #9) In the Applicants Supplemental Response to Data Adequacy Review, a reference was made to Appendix 5.15R containing revisions to previous errors. However, this Appendix has not been posted on the CEC website and still remains unavailable for public review. Will the CEC finally post this document?

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	RESPONSE: See Docket TN#62125, 09/07/2011, CH2MHill / J. Carrier, Supplement to the Application for Certification, 325 pages
10.32	COMMENT: (p.14-18 #10) Given the fact that the heliostat/mirror assemblies alone will increase the impervious surface area by 26%, wouldn't this be considered a significant unmitigatable change to the existing landscape? Wouldn't this fact require stricter onsite controls to reduce these unmitigatable impacts from adversely affecting the environment? RESPONSE: The increase of impervious area due to the heliostats would be a significant impact, but staff has determined the impact to be mitigable. Compliance with the proposed conditions of certification would ensure potential impacts are reduced to less than significant.
10.33	COMMENT: (p.14-18 #11) In a CEC sponsored workshop on July 2, 2012, regarding Alternatives, a chart was shown comparing the impacts of the HHSEGS to other renewable technologies. Here, it determined the impacts of the HHSEGS to onsite and offsite flooding and other storm water related events as "less than significant". Given the number of issues raised, such as increasing the currently existing impervious surfaces by 26% due to the heliostat/mirror assemblies alone or potential catastrophic impacts to heliostat/mirror assemblies from storm water velocities associated with alluvial fans, would Staff revisit this determination and more fully explore the adverse environmental impacts in the Final Staff Assessment? RESPONSE: The increase of impervious area due to the heliostats would be a significant impact, but staff has determined the impact to be mitigable. Compliance with the proposed conditions of certification would ensure potential impacts are reduced to less than significant.
10.34	COMMENT 10.34: (p.14-19 #1) How can review, analysis and appropriate mitigation measures be developed during the AFC CEQA equivalency process if key information and data is out of date and potentially irrelevant? RESPONSE: Staff does not agree that key information is out of date or irrelevant. The data is better described as general and estimated, primarily because the area has not been developed. The applicant submitted in the AFC a pre- and post-construction hydrology studies based on the

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	best available data as well as preliminary studies (such as the preliminary geotechnical analysis) based on present-day site-specific data. Subsequently through responses to data requests, additional information was collected and submitted (such as the soil infiltration analysis). CEQA allows lead agencies to identify performance standards that will govern the development of specific mitigation measures, provided that sufficient information is known in order to evaluate whether the project as designed can achieve the identified mitigation. Depending on the project, a conceptual design or a preliminary design of facilities would meet CEQA's requirement that mitigation measures are feasible and enforceable.
10.35	COMMENT 10.35: (p.14-19 #2) Since the CEC Staff is aware of the potential problems associated with an out of date DESCP, will they require an updated version be made available for review during the AFC CEQA equivalency process? <u>RESPONSE:</u> The proposed design submitted in the AFC is preliminary. This allows for the analysis of potential environmental impacts with the possibility of implementing reasonable design changes to reduce or avoid impacts. During this process, the applicant has proposed changes to the original AFC including: removal of two boilers from each power block (reducing air emissions), undergrounding some onsite linear facilities (reducing visual impacts), and modifications to the west perimeter retention area (in the process of finalizing its preliminary design). Staff is requiring the applicant to update the DESCP to reflect and address these changes and other changes that would result from the environmental review (such as additional mitigation measures required from other technical sections of this **FSA**). Staff has not identified significant issues in the proposed changes because activities can be addressed with existing approved BMPs (California Stormwater BMP Handbook, www.casqa.org).
10.36	COMMENT: (p.14-23 #1) Will Staff please provide a clear definition of what a Zone A flood zone definition is? <u>RESPONSE:</u> Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. Each zone reflects the severity or type of flooding in the area. Zone A is defined as a special flood hazard area subject to inundation by the 1 percent annual chance flood also known as the 100-year flood (the flood that has a 1

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	percent chance of being equaled or exceeded in any given year). Because detailed analyses are not performed for Zone A, no depths or base flood elevations are shown within these zones. This can be rephrased as: a flood hazard area in which the flood zone has no base flood level.
10.37	COMMENT: (p.14-23 #2) While Staff has determined that heliostat pylons and maintenance roads located in the southern portion of the proposed project site will not significantly impede or redirect current flood flows, what impacts would increasing the impervious surfaces have on this area with respect to volume, velocity and rates of flooding? <u>RESPONSE:</u> The applicant's computer model of existing flow conditions uses site specific data with 1-foot contour topography. To model the amount of flooding within the retention area, the applicant made the following adjustments to represent post-construction site conditions: impervious surfaces (heliostats, buildings, asphalt roadways and parking lots), graded dirt roads, protective diversion berms around power blocks, and the elevated west perimeter road. The post-construction model shows exacerbated flooding in the retention area due to the increase of impervious surfaces, but flooding did not significantly increase at the site's south perimeter or north perimeter. Similar results were shown when velocities were modeled.
10.38	COMMENT: (p.14-23 #3) Since one of the definitions for a Zone A flood classification is, its area is “approximate”, why has Staff deemed that merely 200 or 2,000 ft. is fully capable of separating the two zones when definitive data is not available? <u>RESPONSE:</u> FEMA prepares these maps to identify flood-prone areas for programs such as the National Flood Insurance Program (NFIP) that provide federal flood insurance to home and business owners and renters exposed to flood hazards. Staff’s use of the word “approximate” in describing the FEMA Zone A boundaries was because their maps of this area do not include base flood elevations. The 200 foot separation is between to the FEMA Zone A boundary (where water depth is undetermined) and the south end of the proposed berm. The applicant's computer model is a more detailed analysis using1-foot contour topography to calculate flood depths. The post-construction model shows exacerbated flooding between 2-feet and 4-feet deep in the retention area caused by the elevated west

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	perimeter road. This more detailed analysis shows that onsite flooding does not spread into the FEMA designated Zone A areas located north or south of the retention area. Based on the computer modeling, the exacerbated onsite flooding would not redirect Zone A boundaries to housing or buildings.
10.39	COMMENT: (p.14-23 #4) Why did Staff confine the majority of their analysis regarding storm water flows and potential flood impacts to; a) onsite evaluations, b) non-residential areas located near the proposed project boundaries, and c) the east/west axis versus the north/south axis? <u>RESPONSE:</u> Staff assessed the potential for the proposed project to exacerbate flood conditions in the vicinity of the project, both onsite and offsite. Specifically, it addresses the question listed in CEQA Guidelines (Appendix G, VIII. Hydrology and Water Quality): Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site? Staff's analysis focused on the "east/west axis" because the natural terrain of the area directs flows from east to west, as shown on topographic maps of the vicinity. Grading or other modifications to the terrain can increase velocities of naturally occurring flows across the site, which increases the potential for flooding downstream (west of the site). Obstructions that impede naturally occurring flows (such buildings, power plant structures, elevated roads, fences, and vegetation) can increase the potential for flooding onsite as well as upstream (east of the obstruction). The community of Charleston View is roughly the same elevation as the proposed project. In other words, it is neither upstream nor downstream of the project site. Staff recognizes the confusion caused by the sentence (in Surface Water Features): “The majority of runoff flows through the southern portion of the site due to offsite flows originating from the east.” Throughout the site, natural flow direction is from east to west. The modeling of a 100-year storm shows that the majority of sheetflow flooding occurs through Solar Field 2, which is the southern HALF of the project site. Staff has corrected this on page 9.
10.40	COMMENT: (p.14-23 #5) What are the projected impacts to the Old Spanish Trail Highway during a 100-year, 24- hour storm event if the proposed project is approved?

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	RESPONSE: Staff added a discussion on the potential flooding to Old Spanish Trail Highway (also called Tecopa Road). See “Offsite Area Flooding: Impediments to Existing Flow Conditions” on page 34.
10.41	COMMENT: (p.14-24 #6) Can the retention area result in excessive flooding and inundation by following the western perimeter road to join up with other flood flows coming from the south that match the FEMA floodplain maps? RESPONSE: The applicant's computer model of existing flow conditions uses site specific data with 1-foot contour topography. To model the amount of flooding within the retention area, the applicant made adjustments to represent post-construction site conditions: impervious surfaces (heliostats, buildings, asphalt roadways and parking lots), graded dirt roads, protective diversion berms around power blocks, and elevated west perimeter road. The post construction model shows exacerbated flooding in the retention area, but flooding did not spread into the FEMA designated Zone A areas located north or south of the retention area. Flooding would not "match" and meet up with the FEMA delineation for Zone A.
10.42	COMMENT: (p.14-24 #7) Did the CEC Staff check the applicant’s figures for accuracy in the “Estimated Peak Discharge Along Western Boundary” located in Table 5? RESPONSE: The applicant analyzed storm water runoff of the site for both pre-construction and post-construction scenarios. - Staff verified that a pre-approved hydrologic analysis methodology was used. - Staff used in-house software for an independent analysis to compare pre-construction peak flows, and results were similar to those of the applicant. - Staff studied the post-construction analysis and found its approach and assumptions reasonable. Appropriate protocols (HEC-1 and FLO-2D) were used to generate calculated values for the preliminary analysis. The applicant's analysis was based on a preliminary design of the project, which is sufficient for staff to determine if potential impacts are mitigable. Should the project be approved, a revised analysis must be submitted to reflect the project final design, including mitigation measures.

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10.43 10.44	COMMENT 10.43: (p.14-24 #1) What does “help reduce the increase in volume” translate to in terms of degree of actual impact reductions? 1%? 10? 50? Please explain. COMMENT 10.44: (p.14-24 #2) After the measures referred to that would help reduce the increase in volume are implemented, would the remaining impacts still be potentially significant, significant or unmitigatable? <u>RESPONSE TO ALL:</u> Compliance with LID policy is one approach to reducing CEQA impacts related to water quality and flooding. Several counties in California have aggressively promoted the SWRCB's LID policy by implementing new county standards and ordinances. Neither Inyo County nor Lahontan RWQCB requires minimum standards for use of LID practices applicable to the proposed project, so the applicant is not obligated to follow all components of LID. The applicant is proposing several BMPs, and along with staff proposed conditions of certification, CEQA impacts would be less than significant (see discussions under Water Quality and Flooding). Because the applicant isn't required to follow any LID ordinances, they are not required to calculate the increase in volume of storm water runoff caused by the proposed project.
10.45	COMMENT: (p.14-25 #1 (a)) Would Staff recommend as a Condition of Certification, the allowance of onsite septic tanks but eliminate the connected leach fields to ensure the applicant would have to dispose of all wastes offsite versus allowing wastes to seep into local groundwater over the life of the project? <u>RESPONSE:</u> Based on information submitted to date, staff does not identify a reason to restrict the project to the exclusive use of septic tanks and prohibiting the use of leach fields. **SOILS-9** requires that septic systems meet ICEHSD permit requirements.
10.46	COMMENT: (p.14-25 #1 (b)) Would Staff please clearly explain what this means, what the applicant would be exempt from, what the differences between operating with and without the permit are, why the applicant would qualify for a NONA, and how onsite waste disposal generated from the cement batch plant may differ between the two options? <u>RESPONSE:</u>

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	The NPDES Industrial General Permit is a federal permit issued by the California SWRCB, and therefore outside the jurisdiction of the California Energy Commission. Staff was informed by the SWRCB that this permit would be required for concrete batch plant activities. Based on this information, Staff developed **SOILS-3** to ensure that copies of permit-related documents were forwarded to the Compliance Project Manager (Energy Commission Staff). Because this is a federal permit, Staff recognizes that the applicant has the option of requesting an exemption from the issuing agency who has the discretion of either allowing or denying the request. This is also the reason staff developed **SOILS-4**.
10.47	COMMENT 10.47: (p.14-27 #1) Where is the discussion and analysis of impacts to water and soil quality resulting from the HHSEGS's introduction of chemical and hazardous materials to the environment during construction and operations?
10.48	COMMENT 10.48: (p.14-27 #2) When Staff refers to "*could increase the volume*" of pollutants, what is this based on and what degree of volume are they discussing?
10.49	COMMENT 10.49: (p.14-27 #3) When Staff refers to increasing "*possible amounts of pollutants*", what is this based on, what kind of pollutants are they referring to, and what is the possible amount of increases they are referencing?
10.50	COMMENT 10.50: (p.14-28 #4) Since storm water runoff from the entire proposed project site will predominately be directed toward the single point retention area, what are the kinds and volume of both individual and cumulative chemical and hazardous material pollutant impacts if combined with storm water and deposited in this singular area?
10.51	COMMENT 10.51: (p.14-28 #5) What protection will be provided in the retention area to prevent storm water runoff that has combined with onsite chemicals and hazardous materials (i.e., diesel, oil, etc.)? For example, will the retention area be lined with a non-permeable non-toxic substance to prevent saturation of soils and eventual seepage into local groundwater resources?
10.52	COMMENT 10.52: (p.14-28 #6) If the retention area is protected through the installation of a non-permeable, non-toxic liner that prevents soil/water contamination, how will this prevent pollutants from eventually discharging into the environment through the drainage culvert?

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10.53	COMMENT 10.53: (p.14-28 #7) Where has Staff analyzed, discussed and determined impacts of the construction and operations of the HHSEGS with respect to possible adverse impacts to soil resources? <u>RESPONSE TO ALL:</u> All streams of wastewater would be kept completely separated from each other. Sanitary waste would remain contained within the septic system. Industrial wastewater would remain within the power block and processed through the thermal evaporator system. Hazardous liquids would be meticulously handled to prevent spills and accidental release. Wastewater produced from the energy generation process would be processed through the thermal evaporator system. Potentially contaminated storm water (rain that falls onto industrial equipment or other surfaces that might contaminate the storm water) would be collected and processed through the thermal evaporator system. "Clean" storm water would be directed away from the power blocks and allowed to flow toward the west. All BMPs and conditions of certification would strive to prevent any chemical or hazardous pollutants from mixing with the "clean" storm water. The commenter's statement that "all the onsite hazardous materials, emissions, and chemical introductions... just disappear from the equation" is not an accurate description of staff's assessment. The installation of a liner at the proposed retention area is not necessary because this runoff is separated from all other wastewater streams. Staff used the phrase "could increase the volume (of water) and possible amounts of pollutants" to describe a POTENTIAL impact of the proposed retention area, <u>absent</u> any BMPs or conditions of certification. No calculations were made to estimate individual or cumulative volumes of chemical or hazardous pollutants because no amount is allowed. See discussion on page 29.
10.54 10.55	COMMENT 10.54: (p.14-28 #8) The applicant intends to use lead-acid batteries to power the heliostat/mirror assemblies. These batteries may number up well over one hundred thousand. What impacts will storm water runoff have if it contacts these batteries and/or sweeps them into the retention area? COMMENT 10.55: (p.14-28 #9) If a 100-year 24-hour storm event is capable of dislodging 18,000 heliostat/mirror assemblies (or more) from the proposed project site such as was modeled by the BLM for the Ivanpah site, wouldn't this indicate that 18,000 lead-acid batteries (or more) would also be dislodged during this same storm event? What would be the impacts to water and soil quality if this happened?

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10.56	COMMENT 10.56: (p.14-28 #10) How many lead-acid batteries being dislodged and swept into the retention area and/or surrounding environment would it take to become a "significant adverse impact" to the environment? To water quality? To soil resources? RESPONSE TO ALL: The battery to operate a heliostat's pointing motor would be mounted to each heliostat above the ground. The battery is roughly the same size as a car battery with the same construction; each containing lead plates and one to two quarts of sulfuric acid. Like a car battery, it is sealed in a strong case and chances are extremely low that it would leak if dropped from that height. However, should a spill occur, the acid can be neutralized and it would not generate any significant toxic gases. Lead-acid batteries are more fully discussed in the **Hazardous Materials Management** section of this **FSA**. Additionally, Lead-acid batteries would have to be disposed of properly as hazardous waste, as required in the **Waste Management** section of this **FSA**.
10.57	COMMENT 10.57: (p.14-28 #11) What site-specific data does Staff rely upon to reach their determination that the construction and operation of the HHSEGS will not result in significant degradation of water quality or soil resources over the proposed project's life span? REPONSE: Staff reviewed publically available information and information submitted by the applicant in the AFC and related supplemental material such as subsequent data responses. Staff also consulted with various local and State agencies in addition to applying professional analysis and judgment.
10.58	COMMENT 10.58: (p.14-28 #12) How far into the project's lifetime did Staff analyze or model site-specific cumulative impacts of listed chemicals, hazardous materials and substances that will be utilized over the proposed project's lifetime that resulted in Staff's "*not identifying any significant impacts to water quality as a result of the retention area"*? RESPONSE: The AFC states that HHSEGS would be designed for an operating life of 25 to 30 years. Staff's analysis covers the entire operating life in addition to decommission and closure activities after the proposed project discontinues operations.
10	**Intervenor - Cindy MacDonald**

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	Other Technical Sections (as indicated)
AIR RESOURCES 10.23	COMMENT 10.23: (p.3-9, #1) If the applicant chooses to directly wire the heliostats, how many feet/yards/miles of trenching will be required and what does this translate to in terms of acreage disturbance at the project site? RESPONSE: Based on the Ivanpah project (that uses BrightSource technology and is currently under construction), wires would connect a group of heliostats together with the wire fastened down at the ground surface. Several groups are connected to an above ground electrical box. Multiple electrical boxes would be located throughout the solar field. Underground cables would connect the electrical boxes to the service building of the respective solar power plant. Much of the trenching (roughly 2 feet deep) would occur along the footprint of the spur roads that cut across the solar fields, so no additional soil disturbance would occur in these areas. However, trenching would likely occur between spur roads also, which would be additional soil disturbance. The applicant has not provided the amount of additional trenching this would require. Staff will have the applicant address potential impacts in the final DESCP required in **SOILS -1**.
AIR RESOURCES 10.26	COMMENT 10.26: (p.3-10, #1) How many roads circle the power towers for each plant under each design element (20-ft versus 10 ft)? RESPONSE: Because the applicant's post-construction calculations used 10-foot wide concentric drive zones around each solar tower, staff considers this to be the intended design. Staff did not assess the project using 20-foot wide concentric drive zones because the post construction calculations indicated 10-foot wide roads and not 20-foot wide roads. Because the circular layout of each solar field is contained within two irregular shapes, the number of roads surrounding each tower varies depending on direction from the solar tower. The "Civil Overall Site Plan" (AFC, Appendix 5.15A, Pg. 897, www.energy.ca.gov\\sitingcases\\hiddenhills\\documents\\applicant\\afc\\Volume-2-Appendixes) shows the layout of 10-foot wide dirt roads. Solar Plant 1 would have 13 complete circles, but as many as 41 roads. Solar Plant 2 would have 8 complete circles, but as many as 33 roads. The applicant has not submitted site plans showing 20-foot wide dirt roads within the solar fields.
AIR RESOURCES 10.27	COMMENT 10.27: (p.3-10, #2) What is the projected total surface in acreage values for each of these maintenance road design elements and what is the difference in

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	values between them? Example, 20-ft roads result in 500 acres of disturbance, 10-ft roads result in 1,000 acres of disturbance. RESPONSE: Because the applicant's post-construction calculations used 10-foot wide concentric drive zones around each solar tower, staff considers this to be the intended design. Staff did not assess the project using 20-foot wide concentric drive zones because the post-construction calculations indicated 10-foot wide roads and not 20-foot wide roads. Paved roads: 16 acres Fully graded dirt roads (12' & 20'): 18.2 acres Partially graded dirt roads (10'): 171 acres
AIR RESOURCES 10.28	COMMENT 10.28: (p.3-10, #3) How many miles of roads for each kind of road (paved, fully graded, partially graded) is the completed proposed project projected to have? RESPONSE: When assessing amount of soil disturbance, staff is concerned with area of roadway rather than number of miles.
AIR RESOURCES 10.29	COMMENT 10.29: (p.3-10, #4) What is the total number of square feet for each kind of road (paved, fully graded, partially graded) that will be incorporated into the proposed project sites operational design? RESPONSE: 1 acre = 43,560 square feet Paved roads: 16 acres = 696,960 square feet Fully graded dirt roads (12' & 20'): 18.2 acres = 792,792 square feet Partially graded dirt roads (10'): 171 acres = 7,448,760 square feet
AIR RESOURCES 10.64	COMMENT 10.64: (p.3-17, #4) How can the 200,000 to 400,000 gallons of recycled water be counted on for dust control if its discharge depends on the fluid sample levels of contamination? RESPONSE: The reuse of this wastewater (hydrostatic test water or passivating/cleaning fluid) was accounted for in the applicant's calculation when requesting the use of 288 AFY of water for construction activities.
AIR RESOURCES 10.65	COMMENT 10.65: (p.3-17, #5) What happens to this recycled water if it fails to register as “clean”? How will it be disposed of?

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	RESPONSE: Water discharge (hydrostatic test water or passivating/cleaning fluid) that does not meet requirements for reuse onsite would be trucked offsite for disposal at an approved facility. **SOILS-7** (Construction Wastewater Discharge) requires disposal offsite at an appropriately licensed facility.
AIR RESOURCES 10.66 AIR RESOURCES 10.67	COMMENT 10.66: (p.3-17, #6) Will the applicant just dilute the recycled water until it registers as "clean"? If so, how much additional water would this require? COMMENT 10.67: (p.3-17, #7) If the fluid samples fail to register as "clean" and the applicant dilutes it with additional water until it can register as clean enough for discharge, isn't the same amount of "nonclean" chemicals being discharged into the environment? If so, what is the cumulative affect of this discharge to soil, water and biological resources over the life of the proposed project? RESPONSE TO ALL: The NPDES General Permit relating to this wastewater is a federal permit issued by the California SWRCB, and therefore outside the jurisdiction of the California Energy Commission. Staff was informed by the Water Board that this permit would be required. Based on this information, Staff developed **SOILS-7** (Construction Wastewater Discharge) to ensure that copies of permit-related documents were forwarded to the Compliance Project Manager (Energy Commission Staff). Because this is a federal permit, Water Board staff administers and enforces its requirements. This permit program is designed to ensure there are no discharges from project operations that would result in water quality impacts.
AIR RESOURCES 10.108	COMMENT 10.108: (p.3-32, #2) How can the soil disturbance of installing 170,000 heliostat/mirror assemblies be considered "negligible"? RESPONSE: In the construction industry, disturbed area or soil disturbance area typically means an area that is altered as a result of clearing, grading, and/or excavation. Staff use of "negligible" in describing heliostat installation in the field (vehicle driving, vegetation mowing, and foot traffic) reflected that no grading would be required. Staff changed the description from "Soil Disturbance Area" to "Area of Land Grading and Excavation" to avoid confusion. Please see the Total Soil Disturbance discussion and **Soils & Surface Water Table 6.**

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AIR RESOURCES 10.109	COMMENT 10.109: (p.3-32, #3) Where is the site-specific data located that describes how the heliostat/mirror assemblies will be installed, how many will be installed per day per ATV and how long this process is expected take? RESPONSE: The general installation procedure for heliostats is found in the **Project Description** section of this **FSA**. Information about the number of heliostats installed per day is not included, and staff does not need to know that in order to complete its analysis. The applicant may be able to answer this question for the commenter.
LAND USE 10.12	COMMENT 10.12: (p. 10-4, #1) What will be the affected acreage of “temporary housing” and where will it be located?
LAND USE 10.13	COMMENT 10.13: (p. 10-4, #2) How many temporary housing units would be installed, when would they be installed and for how long would they remain active?
LAND USE 10.14	COMMENT 10.14: (p. 10-4, #3) What will be the affected resources and impacts of temporary housing if the CPM authorizes it? Topics should include construction worker traffic analysis, additional roadways if required, additional septic tanks//leach fields if required, additional water requirements, impacts to biological, cultural/historic and visual resources, etc.
LAND USE 10.15	COMMENT 10.15: (p. 10-4, #4) What will happen to the area that lodged the temporary housing once it is no longer needed? How will it be developed, maintained and/or reclaimed?
LAND USE 10.16	COMMENT 10.16: (p. 10-4, #5) What is the projected amount of revenue the “transient tax” would generate for Inyo County and/or the State of California based on this temporary housing? RESPONSE TO ALL: The text "from temporary worker housing" was a typo in **SOILS-8** (Septic System and Leach Field Requirements). The text was unintentional and is no longer included in the condition (renumbered **SOILS-9**). The analysis in the **Socioeconomics** section of this **FSA** shows that no additional housing, temporary or otherwise, would need to be constructed as a result of project construction and operations. There is enough available housing in the area to accommodate those workers who may temporarily relocate closer to the project site during

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	construction.
OPERATIONS 10.10	COMMENT: (p. 12.-3, #8) What is the reason(s) for the differing design elements description and discrepancy? RESPONSE: **Traffic and Transportation** (pg. 622 of PSA) took information from AFC, Project Description, Section 2.1.2.4. **Soils and Surface Water** (pg. 571 of PSA) took information from the Preliminary Construction SWPPP-DESCP (Appendix 5.15A of AFC) in two locations: Post-construction Hydrology Calculations (Attachment H, pg 706) and Grading and Drainage (Attachment I, pg 897).
OPERATIONS 10.11	COMMENT: (p. 12.-3, #9) Which one of these design descriptions is currently accurate? RESPONSE: Because the applicant's post-construction calculations used 10-foot wide concentric drive zones around each solar tower and not 20-foot wide, staff considers this to be the intended design.
OPERATIONS 10.12	COMMENT: (p. 12.-3, #10) Which one of these design elements is incorporated in the AFC files and where is it located? RESPONSE: **Traffic and Transportation** (pg. 622 of PSA) took information from AFC, Project Description, Section 2.1.2.4. **Soils and Surface Water** (pg. 571 of PSA) took information from the Preliminary Construction SWPPP-DESCP (Appendix 5.15A of AFC) in two locations: Post-construction Hydrology Calculations (Attachment H, pg 706) and Grading and Drainage (Attachment I, pg 897).
OPERATIONS 10.13	COMMENT: (p. 12.-4, #11) How many roads circle the power towers for each plant under *each* design element? RESPONSE: Because the circular layout of each solar field is contained within two irregular shapes, the number of roads surrounding each tower varies depending on direction from the solar tower. The "Civil Overall Site Plan" (AFC, Appendix 5.15A, Pg. 897,

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	www.energy.ca.gov/sitingcases/hiddenhills/documents/applicant/afc/Volume-2-Appendixes) shows the layout of 10-foot wide dirt roads. Solar Plant 1 would have 13 complete circles, but as many as 41 roads. Solar Plant 2 would have 8 complete circles, but as many as 33 roads. The applicant has not submitted site plans showing 12-foot wide dirt roads within the solar fields.
OPERATIONS 10.14	COMMENT 10.14: (p. 12.-4, #12) What is the projected total surface in acreage values for *each* of these maintenance road design elements and what is the difference in values between them? Example, 20-ft roads result in 500 acres of disturbance, 10-ft roads result in 1,000 acres of disturbance.
OPERATIONS 10.15	COMMENT 10.15: (p. 12.-4, #13) Do changes in acreage values for maintenance paths/drive zones result in changes to the number of installed heliostats/mirrors? If so, by how many?
OPERATIONS 10.16	COMMENT 10.16: (p. 12.-4, #14) What are the differences in impacts to the Low Impact Design element of the proposed project if the 20-ft drive zones are utilized versus the 10-ft maintenance paths?
OPERATIONS 10.17	COMMENT 10.17: (p. 12.-4, #15) What are the differences between sheet flow, drainage and surface run off between these two design elements?
OPERATIONS 10.18	COMMENT 10.18: (p. 12.-4, #16) Which of the two designs provide the highest level of environmental protection and/or the least amount of environmental impacts and by what degree? <u>RESPONSE TO ALL:</u> Because the applicant's post-construction calculations used 10-foot wide concentric drive zones around each solar tower, staff considers this to be the intended design. Staff did not assess the project using 20-foot wide concentric drive zones. 1 acre = 43,560 square feet Paved roads: 16 acres = 696,960 square feet Fully graded dirt roads (12' & 20'): 18.2 acres = 792,792 square feet Partially graded dirt roads (10'): 171 acres = 7,448,760 square feet
WASTE MGMT 10.2	COMMENT: (p. 18-1, #2) Do California and/or Inyo County allow industrial facilities to discharge waste that could potentially seep into underground water tables residing below the proposed project site?

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	RESPONSE: The Clean Water Act and California Water Code do not allow direct discharge of industrial waste that would degrade groundwater or surface waters. Inyo County and the Regional Water Quality Control Board allow industrial facilities to dispose sanitary and domestic wastewater to an onsite wastewater treatment system (typically consisting of a septic tank, distribution piping, and leach field) provided specific standards are met and a permit is approved.
WASTE MGMT 10.3	COMMENT: (p. 18-1, #3) If so, are there any restriction on what can be discharged into leach fields and under what authority (LORS) are these restrictions established? RESPONSE: California currently does not have statewide rules and regulations regarding onsite wastewater treatment, but the State Water Resource Control Board is in the process of preparing uniform regulations for California. Until then, new septic systems in Inyo County must comply with the Uniform Plumbing Code (Section 107(d), Chapter 1 Part 1) and the Lahontan Basin Plan (Section 4.4, Individual Wastewater Treatment Systems). HHSEGS would be required to comply with the adopted LORS in effect at the time any new onsite septic system would be constructed. Inyo County Environmental Health Services Department (ICEHSD) is responsible for permitting and inspecting the installation septic systems to ensure LORS are met. ICEHSD has published an onsite sewage treatment and disposal guide which includes information on site evaluation and system design. http://www.inyocounty.us/EnvironmentalHealth/residential_septic_systems.html
WASTE MGMT 10.4	COMMENT: (p. 18-2, #1) What waste disposal system is going to be utilized for the proposed HHSEGS, septic tanks with leach fields or septic tanks without leach fields that require sanitary wastes to be disposed of offsite? RESPONSE: The use of a septic tank and the use of a leach field are not mutually exclusive. The proposed septic system basically consists of a septic tank, distribution piping, and leach field. Waste water enters tank, allowing solids to settle and scum to float. The settled solids are anaerobically digested, reducing the volume of solids. The excess liquid drains in a relatively clear condition from the tank outlet to a piping network, often lain in a stone-filled trench, that distributes

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	wastewater throughout the leach field. Waste collected in the septic tank that is not decomposed by the anaerobic digestion eventually has to be removed, or else the septic tank fills up and undecomposed wastewater discharges directly to the leach field.
WASTE MGMT 10.5	COMMENT: (p. 18-2, #2) If the septic tank/leach field system is utilized, what are the impacts of discharging this waste into the surrounding environment such as soils and above local water tables? RESPONSE: Improper construction and operation of the septic system could release bacteria and other contaminants into the surrounding area. Regulations are in place to protect groundwater. New septic systems in Inyo County must comply with the Uniform Plumbing Code (Section 107(d), Chapter 1 Part 1) and the Lahontan Basin Plan (Section 4.4, Individual Wastewater Treatment Systems). Included in the requirements are soil percolation standards; minimum separation/set back distances to prevent impacts to groundwater and nearby water wells; and septic tank and leach field design, sizing and construction standards to ensure adequate capacity and proper treatment and disposal of the wastewaters. Inyo County Environmental Health Services Department (ICEHSD) is responsible for permitting and inspecting the installation septic systems to ensure LORS are met. ICEHSD has published an onsite sewage treatment and disposal guide which includes information on site evaluation and system design. http://www.inyocounty.us/EnvironmentalHealth/residential_septic_systems.html
WASTE MGMT 10.6	COMMENT: (p. 18-2, #3) Since no detailed description or critical analysis has yet to occur regarding the engineering and design element of the pipe and drainage systems in relation to the septic tank/leach field waste disposal systems, how can the CEC Staff and/or public know if hazardous wastes and semi-hazardous wastes can potentially be disposed of and discharged into the surrounding environment via the septic tank/leach field system?
WASTE MGMT 10.7	COMMENT: (p. 18-3, #4) What data is available that can confirm no hazardous or semi-hazardous materials will be disposed of via the septic tank/leach field system? RESPONSE TO ALL: The disposal of hazardous wastes or semi-hazardous waste into the

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	septic system is simply illegal. A number of LORS are in place to regulate the generation, transportation, treatment, storage, and disposal of hazardous waste (see Table 1 in the **Waste Management** section of this **FSA**). In addition, condition of certification **WASTE-4** requires an Operation Waste Management Plan for all wastes generated, including hazardous waste. The plan must cover the management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, and disposal requirements and sites. As discussed in the **Waste Management** section of this **FSA**, staff concludes that the proposed project would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation.
WASTE MGMT 10.8	COMMENT: (p. 18-3, #5) Where is the engineering design description in the AFC project data (or subsequent documents) that clearly depicts the septic tank/leach field systems will only be connected to toilets, showers, and sinks associated exclusively with domestic type waste disposal? <u>RESPONSE:</u> The AFC states in the Project Description (Section 2.2.6.1) and the Water Resources section (5.15.3.3.3) that the septic system would collect wastewater discharges from toilets, sinks, and showers. Staff does not require engineering design drawings to verify this during the licensing process, because **SOILS-9** requires that septic systems meet ICEHSD permit requirements. Septic system design would need approval and installation would be inspected to ensure that only domestic type wastewater would connect to the system.
WASTE MGMT 10.9	COMMENT: (p. 18-3, #6) If the septic tank/leach field system is utilized, what mitigation measures can be used to prevent potential soils and underground water systems from being effected by cumulative waste discharges over the life of the proposed project? <u>RESPONSE:</u> **SOILS-9** (Septic System and Leach Field Requirements) would ensure compliance with LORS and, through the protectiveness provided by the County regulatory standards, would reduce potential impacts from the septic systems.
WASTE MGMT 10.10	COMMENT: (p. 18-3, #7) Would Staff recommend as a Condition of Certification, the allowance of onsite septic tanks but eliminate the connected leach fields to ensure the applicant would have to dispose of all wastes offsite

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	versus allowing wastes to seep into local soils and groundwater over the life of the project? RESPONSE: Based on information submitted to date, staff does not identify a reason to restrict the project to the exclusive use of septic tanks and prohibiting the use of leach fields. **SOILS-9** requires that septic systems meet ICEHSD permit requirements.
WASTE MGMT 10.23 WASTE MGMT 10.24	COMMENT: (p. 18-9, #1) Can the CEC know about the potential inclusion of temporary worker housing at or near the proposed project site -not include any data, analysis, potential impact discussions or proposed mitigation measures under CEQA equivalency requirements – and still approve the siting of the proposed project? COMMENT: (p. 18-9, #2) Should temporary worker housing be utilized on or near the proposed project site, what is the maximum number of units that would be authorized and what would be their corresponding waste disposal needs? RESPONSE TO ALL: The text "from temporary worker housing" was a typo in **SOILS-8** (Septic System and Leach Field Requirements). The text was unintentional and is no longer included in the condition (renumbered **SOILS-9** on page 92). The analysis in the **Socioeconomics** section of this **FSA** shows that no additional housing, temporary or otherwise, would need to be constructed as a result of project construction and operations. There is enough available housing in the area to accommodate those workers who may temporarily relocate closer to the project site during construction.
WASTE MGMT 10.26	COMMENT: (p. 18-10, #8) How can the 200,000 to 400,000 gallons of recycled water be counted on for dust control if its discharge depends on the fluid sample levels of contamination? RESPONSE: The reuse of this wastewater (hydrostatic test water or passivating/cleaning fluid) was accounted for in the applicant's calculation when requesting the use of 288 AFY of water for construction activities.
WASTE MGMT 10.27	COMMENT: (p. 18-10, #9) What happens to this recycle water if fails to register as clean? How will it be disposed of?

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	RESPONSE: Water discharge (hydrostatic test water or passivating/cleaning fluid) that does not meet requirements for reuse onsite would be trucked offsite for disposal at an approved facility. **SOILS-7** (Construction Wastewater Discharge) requires disposal offsite at an appropriately licensed facility. See discussion on page 40.
WASTE MGMT 10.28 WASTE MGMT 10.29	COMMENT: (p. 18-10, #10) Will the applicant just dilute the recycled water until it registers as clean? If so how much additional water would this require? COMMENT: (p. 18-10, #11) If the fluid samples fail to register as clean and the applicant dilutes it with additional water until it can register as clean enough for discharge, isn't the same amount of non-clean chemicals being discharged into the environment? If so, what is the cumulative affect of this discharge to soil, water and biological resources over the life of the proposed project? RESPONSE: The NPDES General Permit relating to this wastewater is a federal permit issued by the California SWRCB, and therefore outside the jurisdiction of the California Energy Commission. Staff was informed by the Water Board that this permit would be required. Based on this information, Staff developed **SOILS-7** (Construction Wastewater Discharge) to ensure that copies of permit-related documents were forwarded to the Compliance Project Manager (Energy Commission Staff). Because this is a federal permit, Water Board staff administers and enforces its requirements. This permit program is designed to ensure there are no discharges from project operations that would result in water quality impacts.
13	**Applicant – Hidden Hills Solar I, LLC and Hidden Hills Solar II, LLC**
13.1 (p.233 #1)	COMMENT: Page 4.10 4, Table 2, Title: Please consider revising the title of the table as follows: “Lahontan RWQCB Basin Plan Beneficial Use Designation for Minor Surface Waters in the Pahrump Valley” RESPONSE: Agreed. Change made on page 5.
13.2 (p.233 #2)	COMMENT: Page 4.10 6, Table 3: The following notes should be added to Table 3: (1) The percent composition cannot be applied to the HHSEGS site. This percent composition generally applies to the entire

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	generalized soil association, which is extremely large. For example, within the HHSEGS site there may be only a few of these series present. (2) At least one of these series is expected to contain a petrocalcic horizon. (3) Here are many areas with cryptobiotic crusts and desert pavement; wind and water erosion could potentially be problematic once these are disturbed. RESPONSE: Staff agrees the first note should be added, but the second and third notes are too site-specific for Table 3 on page 6. Mention of the soil's hardpan layer and presence of surface crusts are found elsewhere in the analysis.
13.3 (p.233 #3)	COMMENT: Page 4.10 7, Surface Water Features, 3rd paragraph, 3rd sentence: "Waters of the State" are defined by the State Water Resources Control Board, not the Department of Fish and Game; therefore please revise the sentence as follows: The Lahontan RWQCB and California Department of Fish and Game is are currently reviewing the project; to determine whether any of the onsite washes are "Waters of the State".the RWQCB will verify the extent of jurisdictional waters of the State on the site, and CDFG will verify which of these features will be subject to streambed alteration requirements under Section 1600 of the Fish and Game Code. RESPONSE: Agreed. Change made on page 8 with modification.
13.4 (p.233 #4)	COMMENT: Page 4.10 7, 5th paragraph, last sentence: "The majority of runoff flows through the southern portion of the site due to offsite flows originating from the east." This sentence is not clear. Does it mean that offsite runoff is mostly on the southern boundary? Seems that it would mostly be on the western boundary. RESPONSE: Staff recognizes the confusion caused by the sentence (in Surface Water Features). Throughout the site, natural flow direction is from east to west. The modeling of a 100-year storm shows that the majority of sheetflow flooding occurs THROUGH Solar Field 2, which is the southern HALF of the project site. Staff has corrected this on page 9.
13.5 (p.233 #5)	COMMENT: Page 4.10 11, Linear Facilities, Offsite: The description of the electric transmission line and the natural gas pipeline have been modified. The revised description contained previously in the Applicant's

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	General Document Comments should be used. RESPONSE: The description on page 14 now matches the language in the Project Description section of the **FSA**.
13.6 (p.234 #6)	COMMENT: Page 4.10 11, Linear Facilities, Offsite, last paragraph, 1st sentence: CEQA does not have connected actions. Therefore, delete the sentence "~~Although the Hidden Hills Transmission Project is located entirely in Nevada (and therefore outside Energy Commission jurisdiction), this proposed transmission project is considered in this PSA as a connected action to the proposed HHSEGS project.~~" RESPONSE: Staff does not agree with this comment. See discussion under "Project Impacts Outside the State Border" in the **Executive Summary** of this **FSA**.
13.7 (p.234 #7)	COMMENT: Page 4.10 13, Soil Erosion, 1st paragraph: Please modify the first paragraph since it is vague and replace it with the following from the AFC: Disturbed areas would be stabilized with effective soil cover (such as aggregate, paving, or vegetation) as soon as feasible but no later than 14 days after construction or disturbance is complete in that portion of the site. To reduce erosion potential, best management practices (BMPs) will be implemented in accordance with the SWPPP/DESCP. Vegetation will remain but will be cut (when necessary) to a height that will allow clearance for heliostat function while leaving the root structures intact. Occasional cutting of the vegetation will be performed as needed to permit unobstructed heliostat mirror movement. RESPONSE: Agreed. Change made on page 16 with modification.
13.8 (p.234 #8)	COMMENT: Page 4.10 15, Contaminated Soil and Water, 2nd sentence: This sentence reads, in part: "It is recommended that near surface soils be tested for the potential presence of *these compounds to assess* if there are any potential for unacceptable exposure risks…" (Emphasis added). Please clarify what compounds are being referred to. RESPONSE: This was a typo. Text was updated on page 18 to reflect information in **Waste** section.

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13.9 (p.234 #9)	COMMENT: Page 4.10 20, 2nd bullet, 2nd sentence: Please revise the sentence as follows: "Since the initial filing of the original AFC, ~~several~~ some changes to the project have occurred such as the removal of two boilers from each power block ~~facility layout and basic shape of each power block, the new alignment of onsite linear facilities, relocation of the project switchyard~~ and modifications to the west perimeter retention area. RESPONSE: Changes made with modification. Staff is aware that the proposed switchyard is back at the original location, but the facility layout and basic shape of the powerblock has changed. Original powerblock layout in the AFC (HHSG 2011a, Figure 2.2-1) is different from updated layout from Supplemental Data Response, Set 2 (CH2 2012p, Figure 2.2-1 R1).
13.10 (p.234 #10)	COMMENT: Page 4.10 21, 3rd paragraph, 1st sentence: The proposed project does not constitute an "unusual circumstance." These best management practices (BMPs) are effective and have been proven in other desert projects. RESPONSE: Staff does not intend to imply that BMPs are not effective in desert projects. The unusual circumstance refers to the complex flows characteristic of undeveloped alluvial fans, compared to the more predictable flows of a traditional, continuously flowing stream. The paragraph on page 24 was re-written to explain the need for a Storm Water Damage Monitoring and Response Plan (**SOILS-5**).
13.11 (p.234 #11)	COMMENT: Page 4.10 21, 3rd bullet, Footnote 6: Determination of "Waters of the State" is the job of the SWRCB (or the Lahontan RWQCB), not the California Department of Fish and Game (CDFG). Therefore, please revise: "(~~by California Department of Fish and Game and~~ Lahontan RWQCB)" in the footnote. RESPONSE: Change made on page 26 with modification.
13.12 (p.234 #12)	COMMENT: Page 4.10 26, 3rd paragraph: Regarding the 2nd sentence, VTN performs hydrologic modeling in all sorts of desert environments. Please provide some reasoning for stating "…modeling is imprecise and untested in this desert environment."

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	RESPONSE: Staff agrees that VTN followed preapproved hydrologic analysis methodology and appropriate protocols (HEC-1 and FLO-2D) for the preliminary analysis. The intent of that sentence was to say that alluvial flows are very complex. This area does not have the benefit of historical flood data to compare to the estimated flow calculations. The paragraph on page 24 was re-written to explain the need for a Storm Water Damage Monitoring and Response Plan (**SOILS-5**).
13.13 (p.234 #13)	COMMENT: Page 4.10 30, last paragraph, 2nd sentence: Please delete the portion of the following sentence. It is inconsistent with the Socioeconomics PSA section concludes that "there is sufficient existing labor force in the region and the workforce would reside in existing, available housing" (CEC PSA Socioeconomics, page 4.9 15). The portion of the sentence which should be deleted reads: "For example, ~~additional housing may be needed to accommodate workers for construction and operation of the project, or~~ …" RESPONSE: This sentence was intended to be a general statement applicable to any new project. Staff made edits on page 41 removing implications that this statement is specific to the project.
13.14 (p.235 #14)	COMMENT: SOILS-1: Changes to condition. RESPONSE: Staff does not agree with relocation of the "Verification" heading. Other changes made on page 83 with modification.
13.15 (p.237 #15)	COMMENT: SOILS-2: Changes to condition. RESPONSE: Changes made on page 85 with modification.
13.16 (p.237 #16)	COMMENT: SOILS-4: No comments RESPONSE: N/A
13.17 (p.237 #17)	COMMENT: SOILS-5: Changes to condition. RESPONSE: Staff does not agree with relocation of the "Verification" heading. Other changes made on page 89 with modification.

Comment #	COMMENT and RESPONSE
13.18 (p.240 #18)	COMMENT: SOILS-6 (Construction Wastewater Discharge, renumbered SOILS-7): No comments RESPONSE: N/A
13.19 (p.240 #19)	COMMENT: SOILS-7 (Wastewater Collection System, renumbered SOILS-8): No comments RESPONSE: N/A
13.20 (p.240 #20)	COMMENT: SOILS-8 (Septic System and Leach Field Requirement, renumbered SOILS-9): Changes to condition. RESPONSE: Changes made on page 92 with modification.

STAFF CONCLUSIONS AND PROPOSED FINDINGS

Based on the assessment of the proposed Hidden Hills Solar Electric Generating System (HHSEGS), California Energy Commission (Energy Commission) staff proposes the following findings:

- Compliance with an approved DESCP in accordance with Condition of Certification **SOILS-1** would reduce the impacts of soil erosion during construction and operations.
- Condition of Certification **SOILS-5** would reduce impacts of potential storm water damage to heliostat assemblies.
- Conditions of Certification **SOILS -1**, **-2**, and **-3** would reduce or avoid impacts of contact runoff during construction activities. Conditions of Certification **SOILS -1** and **-4** would reduce or avoid impacts of contact runoff during operations.
- Condition of Certification **SOILS-6** would reduce potential offsite flooding impacts to Old Spanish Trail Highway/Tecopa Road. The proposed HHSEGS project would not impede or significantly redirect flood flows of the designated 100-year floodplain. In addition, the project would not be affected by dam failure, tsunami, or seiche.
- The discharge of construction wastewater would be in compliance with LORS and would have no adverse environmental impact provided the requirements of Conditions of Certification **SOILS-1** and **-7** are met.
- The discharge of sanitary waste and industrial wastewater would be in compliance with LORS and would have no adverse environmental impact provided the requirements of Conditions of Certification **SOILS-8** and **-9** are met.
- Compliance with Conditions of Certification **SOILS-2** through **-9**, the HHSEGS project would conform with applicable federal, state, and local LORS and state policy related to water quality and hydrology.

- Staff has not identified any significant impacts that would occur in Nevada regarding water quality and hydrology caused by the proposed HHSGES project. The water quality and hydrology impacts from the linear facilities (transmission line and natural gas line portions) within the state of Nevada would be assessed by BLM under the requirements of the National Environmental Policy Act (NEPA) of 1969.

PROPOSED CONDITIONS OF CERTIFICATION

DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN (DESCP)

SOILS-1 Prior to site mobilization, the project owner shall obtain the CPM's approval for a site specific DESCP that ensures protection of water quality and soil resources of the project site and all onsite linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, and identify all monitoring and maintenance activities. The project owner shall complete all engineering plans, reports, and documents necessary for the CMP to conduct a review of the proposed project and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities comply with all requirements presented herein. The DESCP may be combined with Condition of Certification SOILS-2 (Construction SWPPP). The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1** and shall contain the following elements:

Vicinity Map: A map shall be provided indicating the location of all project elements with depictions of all major geographic features to include watercourses, washes, irrigation and drainage canals, major utilities, and sensitive areas.

Site Delineation: The site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, and drainage facilities. With legend, indicate types and locations of storm water control measures built to permanently control storm water pollution. Distinguish between pollution prevention, treatment, and containment devices. Identify sanitary waste facilities. Adjacent property owners shall be identified on the plan maps. All maps shall be presented at a legible scale

Drainage: The DESCP shall include the following elements:

a. Topography. Topography for offsite areas are required to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing storm water flow and flood hazard. Spot elevations shall be required where relatively flat conditions exist.

b. Proposed Grade. Proposed grade contours shall be shown at a scale appropriate for delineation of onsite ephemeral washes, drainage ditches, and tie-ins to the existing topography.

c. Hydrology. Existing and proposed hydrologic calculations for onsite areas and offsite areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow. Show each discharge location from the site.

d. Hydraulics. Provide hydraulic calculations to support the selection and sizing of the onsite drainage network, diversion facilities and BMPs.

Watercourses and Critical Areas: The DESCP shall show the location of all onsite and nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site. Maps shall identify high hazard flood prone areas. Maps shall show with legend locations of expected sources of pollution generation (i.e. outdoor work and storage areas, delivery areas, trash enclosures, fueling areas) during construction activities and separate maps for operational activities.

Clearing and Grading: The plan shall provide a delineation of all areas to be cleared of vegetation, areas to be preserved, and areas where vegetation would be cut to allow clear movement of the heliostats. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross-sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance shall be properly identified and delineated on the plan maps.

Soil Wind and Water Erosion Control: The plan shall address exposed soil treatments to be used during construction and operation of the proposed project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects to vegetation; BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by the CPM prior to use.

Project Schedule: The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element construction, and final

grading/stabilization). BMP implementation schedules shall be provided for each project element for each phase of construction.

Best Management Practices: The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.

Erosion Control Drawings: The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.

Agency Comments: The DESCP shall include copies of recommendations from the County of Inyo and the California Department of Fish and Game (CDFG). If the DESCP is combined with the Construction SWPPP, the document shall include copies of recommendations from the Lahontan Regional Water Quality Control Board (RWQCB).

Monitoring Plan: Monitoring activities shall include routine measurement and photographs of the volume of accumulated sediment in the onsite drainage ditches, and storm water diversions.

Verification: The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCP shall be submitted to the chief building official (CBO) for review and approval. In addition, the project owner shall do all of the following:

- No later than ninety (90) days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to Inyo County for review and comment. If the DESCP is combined with the Construction SWPPP, the project owner shall submit a copy of the document to the Lahontan RWQCB for review and comment. The CPM shall consider comments received.
- During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage-, erosion- and sediment control measures and the results of monitoring and maintenance activities.
- Once operational, the project owner shall provide in the annual compliance report information on the results of storm water BMP monitoring and maintenance activities.

CONSTRUCTION - NPDES GENERAL PERMIT (SOLAR PLANT 1 & 2)

SOILS-2 The project owner shall fulfill the requirements contained in State Water Resources Control Board's *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities Order No. 2009-0009-DWG, NPDES No. CAS000002* and all subsequent revisions and amendments. The

project owner shall develop and implement a construction Storm Water Pollution Prevention Plan (SWPPP) for the construction of the project.

Verification: At least thirty (30) days prior to site mobilization, the project owner shall submit the construction SWPPP to the CBO and CPM and a copy shall be kept accessible onsite at all times. Within ten (10) days of its mailing or receipt, the project owner shall submit to the CPM any correspondence between the project owner and the Lahontan RWQCB about the general NPDES permit for discharge of storm water associated with this activity. This information shall include any updates to the construction SWPPP, a copy of the notice of intent sent by the project owner to the State Water Resources Control Board and the notice of termination.

INDUSTRIAL - NPDES GENERAL PERMIT (CONCRETE BATCH PLANT)

SOILS-3 For the operation of the temporary concrete batch plant, the project owner shall comply with the requirements of the State Water Resources Control Board's NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities (Order No. 97-03-DWQ, NPDES No. CAS000001) and all subsequent revisions and amendments. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of the temporary concrete batch plant. The project owner may also submit a Notice of Non- Applicability (NONA) to the RWQCB to apply for an exemption to the general NPDES permit.

Verification: At least thirty (30) days prior to operation of the temporary concrete batch plant, the project owner shall submit copies to the CPM of the operational SWPPP and shall retain a copy on site. Within 10 days of its mailing or receipt, the project owner shall submit to the CPM any correspondence between the project owner and the Lahontan RWQCB about the general NPDES permit for discharge of storm water associated with this activity. This information shall include a copy of the notice of intent sent by the project owner to the State Water Resources Control Board and the notice of termination. A letter from the RWQCB indicating that there is no requirement for a general NPDES permit for discharges of storm water associated with industrial activity would satisfy this condition.

INDUSTRIAL - NPDES GENERAL PERMIT (SOLAR PLANT 1 & 2)

SOILS-4 For the operation of Solar Plant 1 and 2, the project owner shall comply with the requirements of the State Water Resources Control Board's NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities (Order No. 97-03-DWQ, NPDES No. CAS000001) and all subsequent revisions and amendments. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of each solar plant. The project owner may also submit a Notice of Non- Applicability (NONA) to the RWQCB to apply for an exemption to the general NPDES permit.

Verification: At least thirty (30) days prior to operation of each solar plant, the project owner shall submit copies to the CPM of the operational SWPPP and shall retain a copy on site. Within 10 days of its mailing or receipt, the project owner shall submit to the CPM any correspondence between the project owner and the Lahontan RWQCB

about the general NPDES permit for discharge of storm water associated with this activity. This information shall include a copy of the notice of intent sent by the project owner to the State Water Resources Control Board and the notice of termination. A letter from the RWQCB indicating that there is no requirement for a general NPDES permit for discharges of storm water associated with industrial activity would satisfy this condition.

STORM WATER DAMAGE MONITORING AND RESPONSE PLAN

SOILS-5: The project owner shall reduce impacts caused by large storms by ensuring heliostats and the west perimeter road (berm) withstand the 100-year storm event, establishing ongoing maintenance and inspection of storm water controls, and implementing a response plan to clean up damage and address ongoing issues.

The project owner shall ensure that the heliostats and west perimeter road (berm) are designed and installed to withstand storm water scour that may occur as a result of a 100-year, 24-hour storm event. The analysis of the storm event and resulting heliostat stability will be provided within a Pylon Insertion Depth and Heliostat Stability Report to be completed by the project owner. This analysis will incorporate results from site-specific geotechnical stability testing, as well as hydrologic and hydraulic storm water modeling performed by the project owner. The modeling will be completed using methodology and assumptions approved by the CPM.

The project owner shall also develop a Storm Water Damage Monitoring and Response Plan to evaluate potential impacts from storm water, including damage to west perimeter road (berm) and heliostats that fail due to storm water flow or otherwise break and scatter mirror debris or other potential pollutants on to the ground surface.

The basis for determination of pylon embedment depths and berm design shall employ a step-by-step process as identified below and approved by the CPM:

A. Determination of peak storm water flow within each sub-watershed from a 100-year event:

- Use of San Bernardino County (SBC) Hydrology Manual to specify hydrologic parameters to use in calculations; and
- HEC -1 and Flo-2D models will be developed to calculate storm flows from the mountain watersheds upstream of the project site, and flood flows at the project site, based upon hydrologic parameters from SBC.
- The use of dry wells or injection wells shall be considered for management of storm water flows that may affect the west perimeter road (berm). These infiltration devices shall be designed and operated in accordance with USEPA Class V Injection Well requirements. The groundwater recharge that may be achieved by these wells can be

considered as credit for mitigation in accordance with **WATER SUPPLY-1**.

B. Determination of potential total pylon scour depth:

- Potential channel erosion depths will be determined using the calculated design flows, as determined in A above, combined with Flo-2D to model onsite sediment transport.
- Potential local scour will be determined using the calculated design flows, as determined in A above, combined with the Federal Highway Administration (FHWA) equation for local bridge pier scour from the FHWA 2001 report, “Evaluating Scour at Bridges.”

C. The results of the scour depth calculations and pylon stability testing will be used to determine the minimum necessary pylon embedment depth within the active channels. In the inactive portions of the alluvial fans that are not subject to channel erosion and local scour, the minimum pylon embedment depths will be based on the results of the pylon stability testing. Minimum pylon embedment depth within the retention area will be based on additional site-specific testing for pylon stability under conditions of saturated soil and standing water.

D. The results of the calculated peak storm water flows and channel erosion and heliostat scour analysis together with the recommended heliostat installation depths shall be submitted to the CPM for review and approval sixty (60) days before the start of heliostat installation.

The Storm Water Damage Monitoring and Response Plan shall be submitted to the CPM for review and approval and shall include the following:

- Detailed maps showing the installed location of all heliostats within each project phase;
- Description of the method of removing all soil spoils should any be generated;
- Each heliostat should be identified by a unique ID number marked to show initial ground surface at its base, and the depth of the pylon below ground;
- Minimum Depth Stability Threshold to be maintained of pylons to meet long-term stability for applicable wind, water (flowing and static), and debris loading effects;
- Above and below ground construction details of a typical installed heliostat;
- BMPs to be employed to minimize the potential impact of broken mirrors to soil resources;
- Construction plans and details of the western perimeter road (berm), including erosion control measures; Include an appendix showing analysis of the berm’s function as discharge control (weir) and retention area (area and duration of standing water)

- Methods and response time of mirror cleanup and measures that may be used to mitigate further impact to soil resources from broken mirror fragments; and
- Monitoring, documenting, and restoring the adjacent offsite downstream property when impacted by sedimentation, berm damage, or broken mirror shards.

A plan to monitor and inspect periodically, before first seasonal and after every storm event:

- Security and Tortoise Exclusion Fence: Inspect for damage and buildup of sediment or debris
- Heliostats within drainages or subject to drainage overflow or flooding: Inspect for tilting, mirror damage, depth of scour compared to pylon depth below ground and the Minimum Depth Stability Threshold, collapse, and downstream transport.
- Drainage channels: Inspect for substantial migration or changes in depth, and transport of broken glass.
- Constructed diversion channels: Inspect for scour and structural integrity issues caused by erosion, and for sediment and debris buildup.
- Adjacent offsite downstream property: Inspect for changes in the surface texture and quality from sediment buildup, erosion, or broken glass.

Short-Term Incident-Based Response:

- Security and Tortoise Exclusion Fence: repair damage, and remove built-up sediment and debris.
- Heliostats: Remove broken glass, damaged structure, and damaged wiring from the ground, and for pylons no longer meeting the Minimum Depth Stability Threshold, either replace/reinforce or remove the mirrors to avoid exposure for broken glass.
- Drainage channels: no short-term response necessary unless changes indicate risk to facility structures.
- West perimeter road (berm) and constructed diversion channels: repair damage, maintain erosion control measures and remove built-up sediment and debris.

Long-Term Design-Based Response:

- Propose operation/BMP modifications to address ongoing issues. Include proposed changes to monitoring and response procedures, frequency, or standards.
- Replace/reinforce pylons no longer meeting the Minimum Depth Stability Threshold or remove the mirrors to avoid exposure for broken glass.

- Propose design modifications to address ongoing issues. This may include construction of active storm water management diversion channels and/or detention ponds.

Inspection, short-term incident response, and long-term design based response may include activities both inside and outside of the project boundaries. For activities outside of the project boundaries the owner shall ensure all appropriate environmental review and approval has been completed before field activities begin.

Verification: At least sixty (60) days prior to installation of the first pylon, the project owner shall submit to the CPM a copy of the Pylon Insertion Depth and Heliostat Stability Report for review and approval prior to construction. At least sixty (60) days prior to commercial operation, the project owner shall submit to the CPM a copy of the Storm Water Damage Monitoring and Response Plan for review and approval prior to commercial operation. The project owner shall retain a copy of this plan onsite at the power plant at all times. The project owner shall prepare an annual summary of the number of heliostats failed due to damage, cause and extent of the damage, and cleanup and mitigation performed for each damaged heliostat. The annual summary shall also report on the effectiveness of the berm against storms, including information on the damage and repair work or associated erosion control elements of the berm. The project owner shall submit proposed changes or revisions to the Storm Water Damage Monitoring and Response Plan to the CPM for review and approval.

PERIMETER DRAINAGE MANAGEMENT PLAN

SOILS-6: The project owner shall develop and implement a Perimeter Drainage Management Plan to reduce flooding and erosion damage to the section of Old Spanish Trail Highway/Tecopa Road adjacent to the project site. The post-development flood depth calculated for the 100-year, 24-hour storm shall not increase more than one foot at any point on Tecopa Road adjacent to the project site.

The project owner shall provide a detailed hydraulic analysis utilizing FLO-2D which models pre- and post-development flood conditions for the 2-, 5-, 10-, 25-, and 100-year storm events. Boundaries of the analysis shall include the floodplain area from where Stump Springs area runoff flows cross the Nevada border to one mile west of the HHSEGS west property line. The methodology and assumptions for the modeling shall be reviewed and approved by the CPM.

The Perimeter Drainage Management Plan shall be submitted to the CPM for review and approval and shall incorporate the following:

- Vegetation shall be placed to promote infiltration and flow into the solar field. Vegetation planting and establishment shall comply with Condition of Certification **VIS-2**. Vegetation management shall include control of invasive vegetation as prescribed in Condition of Certification **BIO-18**. Fencing shall comply with VIS-2 and **BIO-9**.

- Landscape area between the roadway and perimeter fence shall implement erosion protection from flow velocity of two feet per second along the roadway and discharge from these flows to adjacent property west of the project site.
- Storm water control and conveyance structures (i.e. drop inlets, culverts) shall be designed to prevent desert tortoise from entering the structure or entering the project site. Localized ponding shall not remain longer than 24 hours.
- The use of dry wells or injection wells shall be considered for management of flood flows and artificial recharge of the groundwater aquifer in the project area. These infiltration devices shall be designed and operated in accordance with USEPA Class V Injection Well requirements. The groundwater recharge that may be achieved by these wells can be considered as credit for mitigation in accordance with **WATER SUPPLY-1**.
- Maintenance methods and scheduling shall be identified in the Plan to ensure proper operation of storm water control and conveyance structures and other Best Management Practices (BMPs)
- Elements of monitoring, inspection, and damage response (short-term and long-term) prescribed in Condition of Certification **SOILS-5** shall be implemented in maintenance of storm water conveyance and erosion control features identified in the Perimeter Drainage Management Plan.

Verification: At least sixty (60) days prior to perimeter fence installation, the project owner shall submit to the CPM a copy of the preliminary Perimeter Drainage Management Plan for review.

In combination with Condition of Certification **CIVIL-1**, at least fifteen (15) days (or project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

Any proposed changes or revisions to the approved Storm Water Damage Monitoring and Response Plan must be reviewed and approved by the CPM.

CONSTRUCTION WASTEWATER DISCHARGE

SOILS-7 Prior to hydrostatic test water discharge to land, the project owner shall fulfill the requirements contained in State Water Resources Control Board (SWRCB) *Order No. 2003-003-DWQ Statewide General Waste Discharge Requirements (WDRs) for Discharges to Land with a Low Threat to Water Quality (General WDRs)* and all subsequent revisions and amendments.

Prior to hydrostatic test water discharge to surface waters or designated Waters of the State, the project owner shall fulfill the requirements contained in Lahontan RWQCB *Order No. R6T-2008-0023 (Revised Waste Discharge*

Requirements and NPDES General Permit for Limited Threat Discharges to Surface Waters) and all subsequent revisions and amendments.

Prior to transport and disposal of any facility construction-related wastewaters offsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project owner shall provide evidence that wastewater is disposed of at an appropriately licensed facility. The project manager shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements).

Verification: The project owner shall submit to the CPM copies of all relevant correspondence between the project owner and the SWRCB or Lahontan RWQCB about the hydrostatic test water discharge requirements within 10 days of its receipt or submittal. This information shall include copies of the Notice of Intent and Notice of Termination for the project. A letter from the SWRCB or Lahontan RWQCB indicating that there is no requirement for the discharge of hydrostatic test water would satisfy the corresponding portion of this condition.

Prior to transport and disposal of any facility construction-related wastewaters offsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project manager shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements). The project owner shall provide evidence to the CPM of proper wastewater disposal, via a licensed hauler to an appropriately licensed facility, in the monthly compliance report.

WASTEWATER COLLECTION SYSTEM

SOILS-8 The project owner shall recycle and reuse all process wastewater streams to the extent practicable. Prior to transport and disposal of any facility operation wastewaters that are not suitable for treatment and reuse onsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project owner shall provide evidence that industrial wastewater and contact storm water are being disposed of at an appropriately licensed facility. The project owner shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements). An annual summary of industrial wastewater discharge shall be submitted to the CPM in the annual compliance report.

Verification: Prior to transport and disposal of any facility operation wastewaters that are not suitable for treatment and reuse onsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project manager shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste

Discharges to Land requirements). The project owner shall provide evidence to the CPM of proper industrial wastewater disposal, via a licensed hauler to an appropriately licensed facility, in the annual compliance report.

The project owner shall submit an industrial wastewater discharge summary report to the CPM in the annual compliance report for the life of the project operation. The report shall include the results of chemical analysis for proper disposal offsite, average TDS concentration, monthly range, monthly average, daily maximum within each month, and annual discharge volume by the project. After the first year and for subsequent years, this information shall also include the yearly range and yearly average discharge volume by the project.

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

SOILS-9 The project owner shall comply with the requirements and all subsequent revisions and amendments of the Inyo County Environmental Health Services Department (Inyo County Codes 7.52.020 and 7.52.060), the California Plumbing Code (California Code of Regulations Title 24, Part 5), and the Lahontan RWQCB Basin Plan while designing, constructing, and operating the HHSEGS sanitary waste disposal facilities such as septic systems and leach fields. Compliance shall include an engineering report on the septic system and leach field design, operation, maintenance, and loading impact to groundwater.

The project owner shall submit all necessary information and the appropriate fee to the Inyo County Environmental Health Services Department to ensure that the project has complied with county sanitary waste disposal facilities requirements. Written assessments prepared by Inyo County regarding the project's compliance with these requirements must be submitted to the CPM for review and approval.

Verification: At least thirty (30) days prior to use of the septic systems, the project owner shall submit to the CPM for review and approval a written assessment prepared by Inyo County regarding the project's compliance with the requirements above.

REFERENCES

BLM 2011 – Bureau of Land Management. Project Fact Sheet: Hidden Hills Transmission Project. November 2011.

BLM 2012b – BLM/A. Lueders and J. Kenna (tn: 66238) BLM Comment Letter Regarding PSA. 7/16/2012

CEC 2012u – California Energy Commission/M. Monasmith (tn: 65442) Preliminary Staff Assessment. 5/24/2012

CEC 2012ii – California Energy Commission/M. Monasmith (tn: 67868) Record of Conversation with Candace Hill and D. Crom re flooding on Tecopa Road. 8/31/2012

CH2 2012k – CH2MHill/J. Carrier (tn: 64364) Applicant's Data Response Set 1C-2. 3/23/2012

CH2 2012p – CH2MHill/J. Carrier (tn: 64558) Supplemental Data Response, Set 2, Boiler Optimization Plan and Design Change. 4/2/2012

CH2 2012u – CH2MHill/J. Carrier (tn: 64836) Supplemental Data Response, Set 3. 4/18/2012

CH2 2012y – CH2MHill/J. Carrier (tn: 65092) Applicant's Data Response, Set 2E 5/04/2012

CH2 2012ee– CH2MHill/J. Carrier (tn: 66319) Applicant's PSA Comments, Set 2. 7/23/2012

CH2 2012hh– CH2MHill/J. Carrier (tn: 66549) Applicant's Letter Confirming Relocation of the Switchyard and Gas Metering Station. 8/10/2012

CH2 2012ii– CH2MHill/J. Carrier (tn: 67060) Applicant's Supplemental Data Response, Set 4B. 9/10/2012

CH2 2012ll– CH2MHill/J. Carrier (tn: 65209) Applicant's Supplemental Data Response Set 4. 5/11/2012

DWR 2004 – California Department of Water Resources. California's Groundwater – Bulletin 118, Update 2004, Pahrump Valley Groundwater Basin. Website publication: http://www.water.ca.gov/pubs/groundwater/bulletin_118/

HHSG 2011a – BrightSource Energy/J. Woolard (tn: 61756) Application for Certification, Volume 1 & 2. 08/5/2011

HHSG 2011b – BrightSource Energy/C. Jensen (tn: 62125) Supplement to AFC for HHSEGS. 09/07/2011

INYO 2012j – Inyo County/M. Fortney (tn: 66310) Inyo County Comments on PSA. 7/17/2012

J&S 2001 – Jones & Stokes. Goals and Policies Report for the Inyo County General Plan, prepared for Inyo County. December 2001.

MAC 2012c - Cindy MacDonald (tn: 66291) Cindy McDonald's Supplemental Comments and Analysis. 07/23/2012

RWQCB 2005 – California Regional Water Quality Control Board, Lahontan Region. Water Quality Control Plan for the Lahontan Region (Basin Plan) amended 2005.

USGS 1989 - U.S. Geological Survey/Arcement and Schneider. “Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains”, U.S. Geological Survey Water-Supply Paper 2339, Denver, Colorado. 1989.

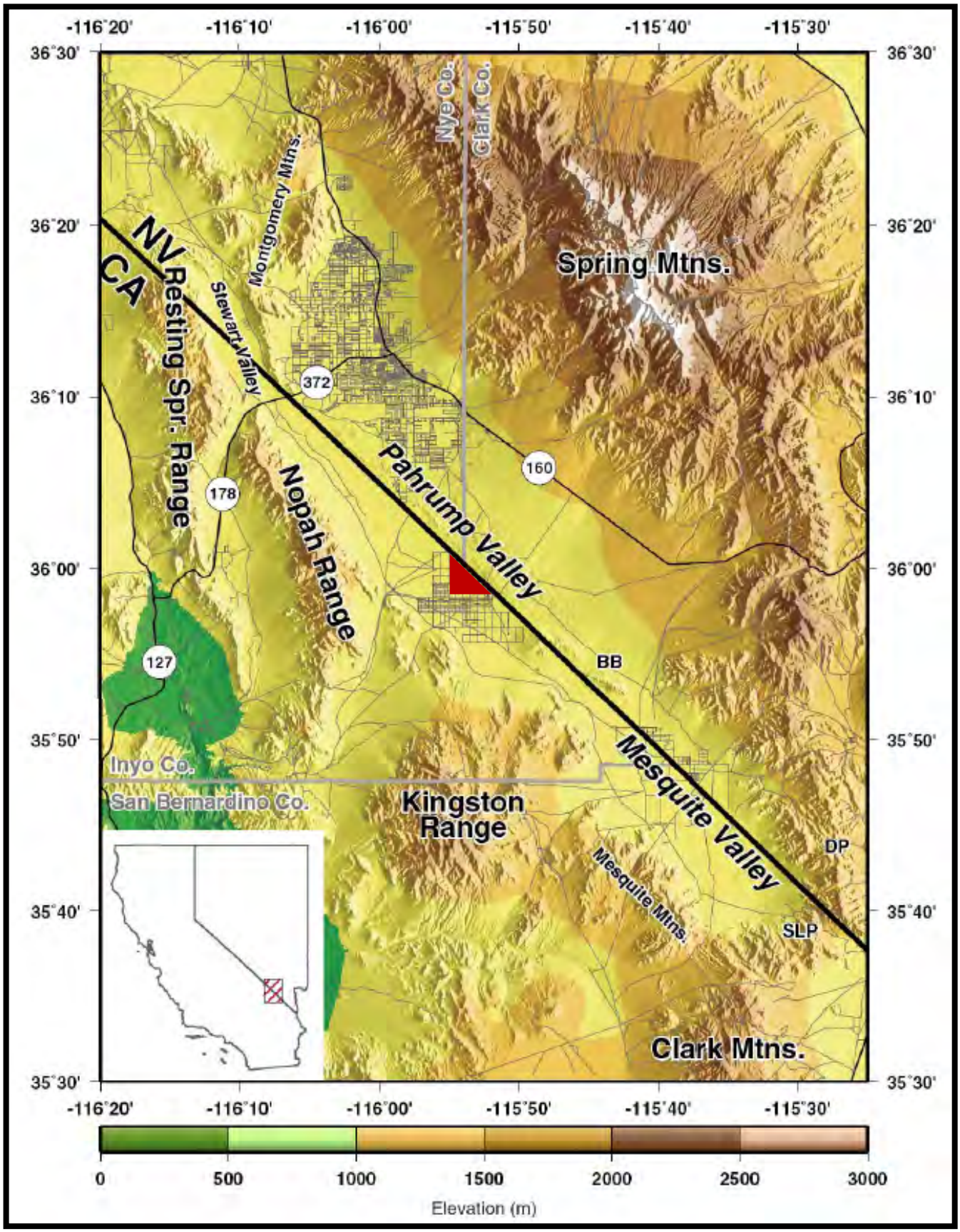
ACRONYMS

Acronyms Used in the Soils & Surface Water Section

AFC	Application for Certification
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CWA	Clean Water Act
DESCP	Drainage, Erosion, and Sediment Control Plan
FEMA	Federal Emergency Management Agency
FSA	Final Staff Assessment
GPS	global positioning system
HHSEGS	Hidden Hills Solar Electrical Generating System
ICEHSD	Inyo County Environmental Health Services Department
kV	kilovolt
LID	Low Impact Development
LORS	Laws, Ordinances, Regulations and Standards
msl	mean sea level
MW	megawatts
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PSA	Preliminary Staff Assessment
QFER	Quarterly Fuel and Energy Reports
RWQCB	Regional Water Quality Control Board
SRSG	solar receiver steam generator
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TSS	total suspended solids
USACE	U.S. Army Corp of Engineers
WDR	Waste Discharge Requirements

SOILS & SURFACE WATER - FIGURE 1

Hidden Hills Solar Electric Generating System (HHSEGS) – Vicinity Map



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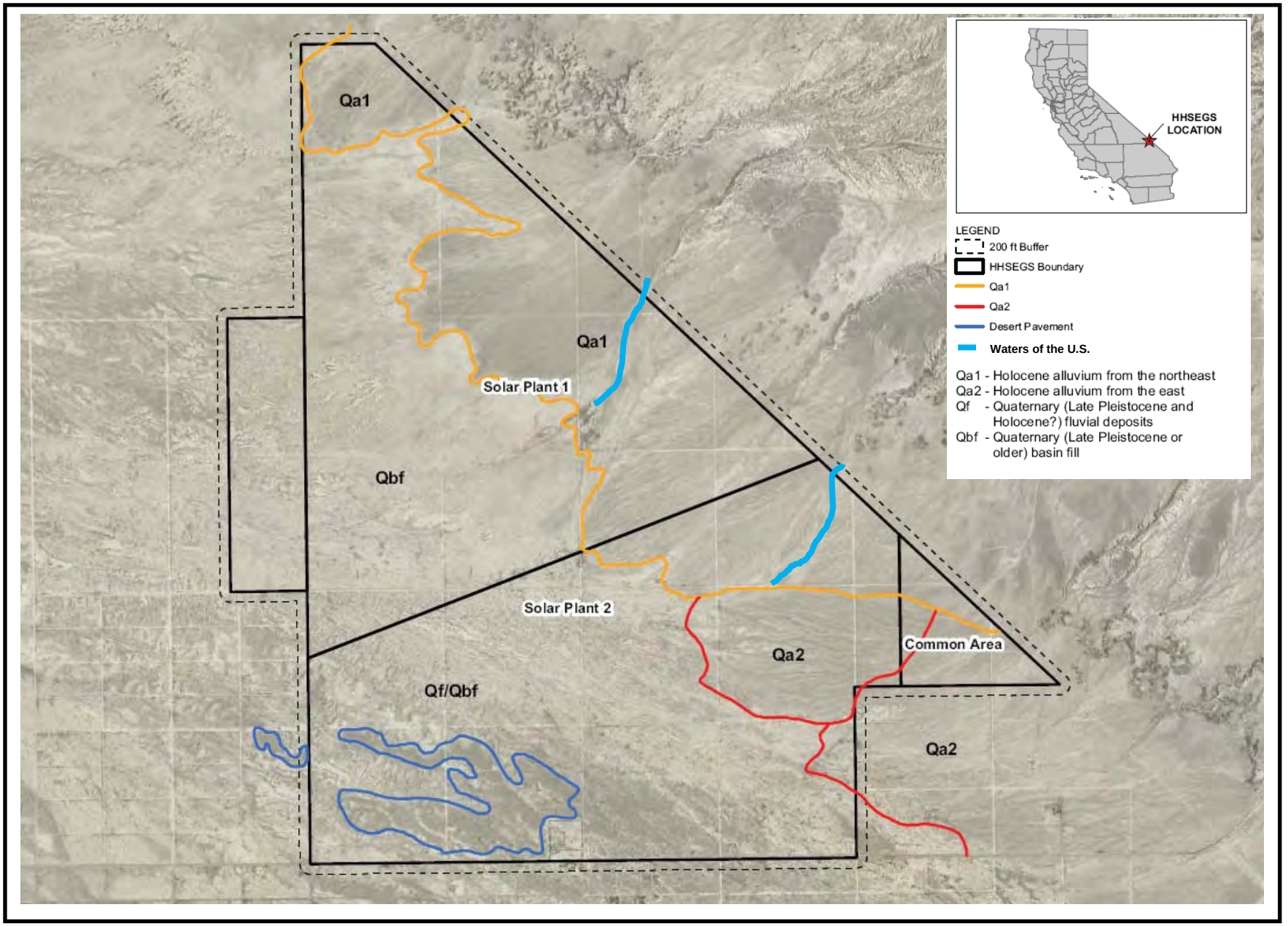
SOURCE: Geosphere, April 2010, Figure 1, Page 94

SOILS & SURFACE WATER - FIGURE 2

Hidden Hills Solar Electric Generating System (HHSEGS) – Alluvial Fans and Waters of the U.S.



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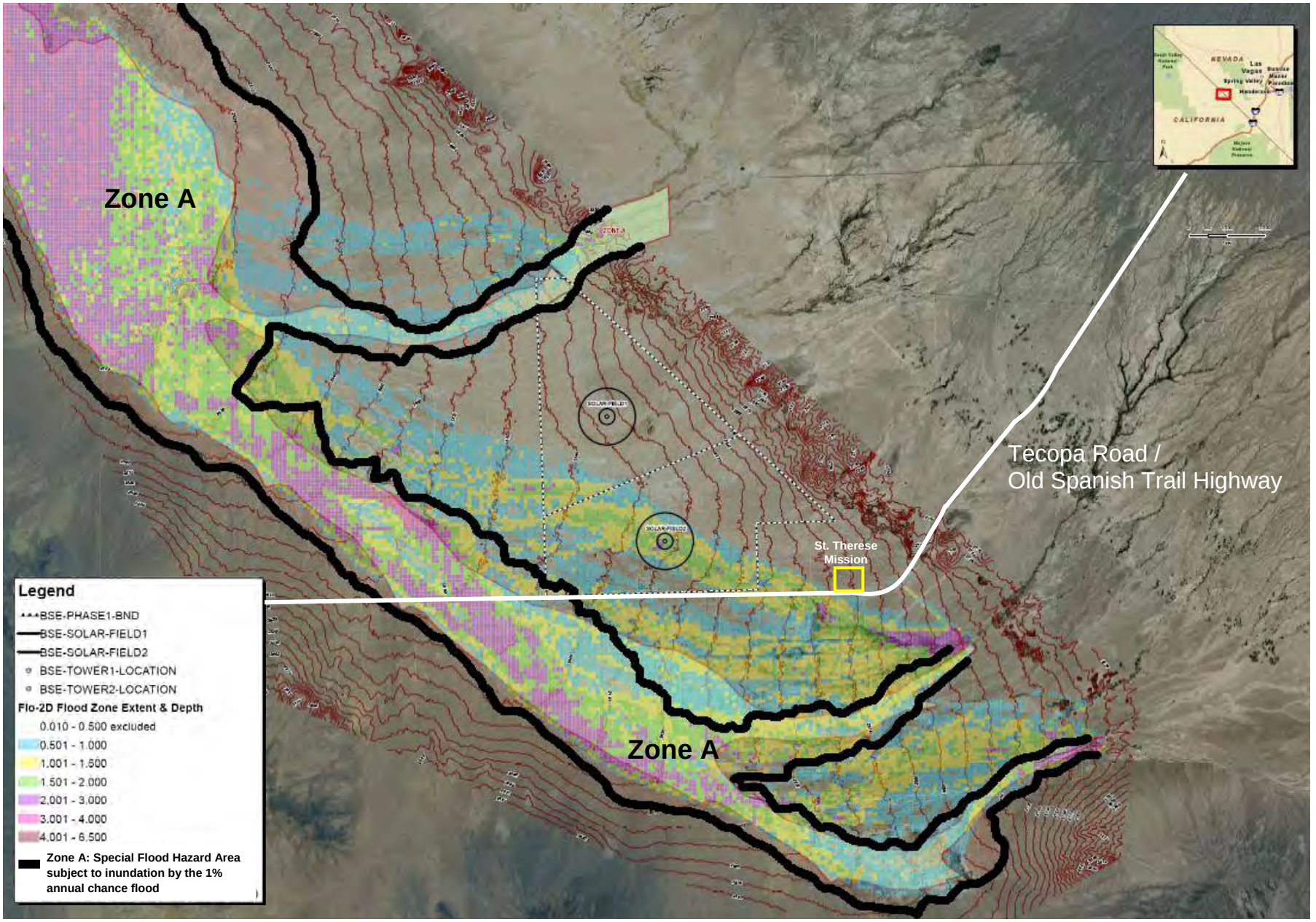
SOURCE: Figure DR 101-1, Land Surface Units; CH2MHill, Fig 1, URS and BrightSource Energy

SOILS & SURFACE WATER - FIGURE 3

Hidden Hills Solar Electric Generating System (HHSEGS) – Federal Emergency Management Agency – Flood Insurance Rate Map



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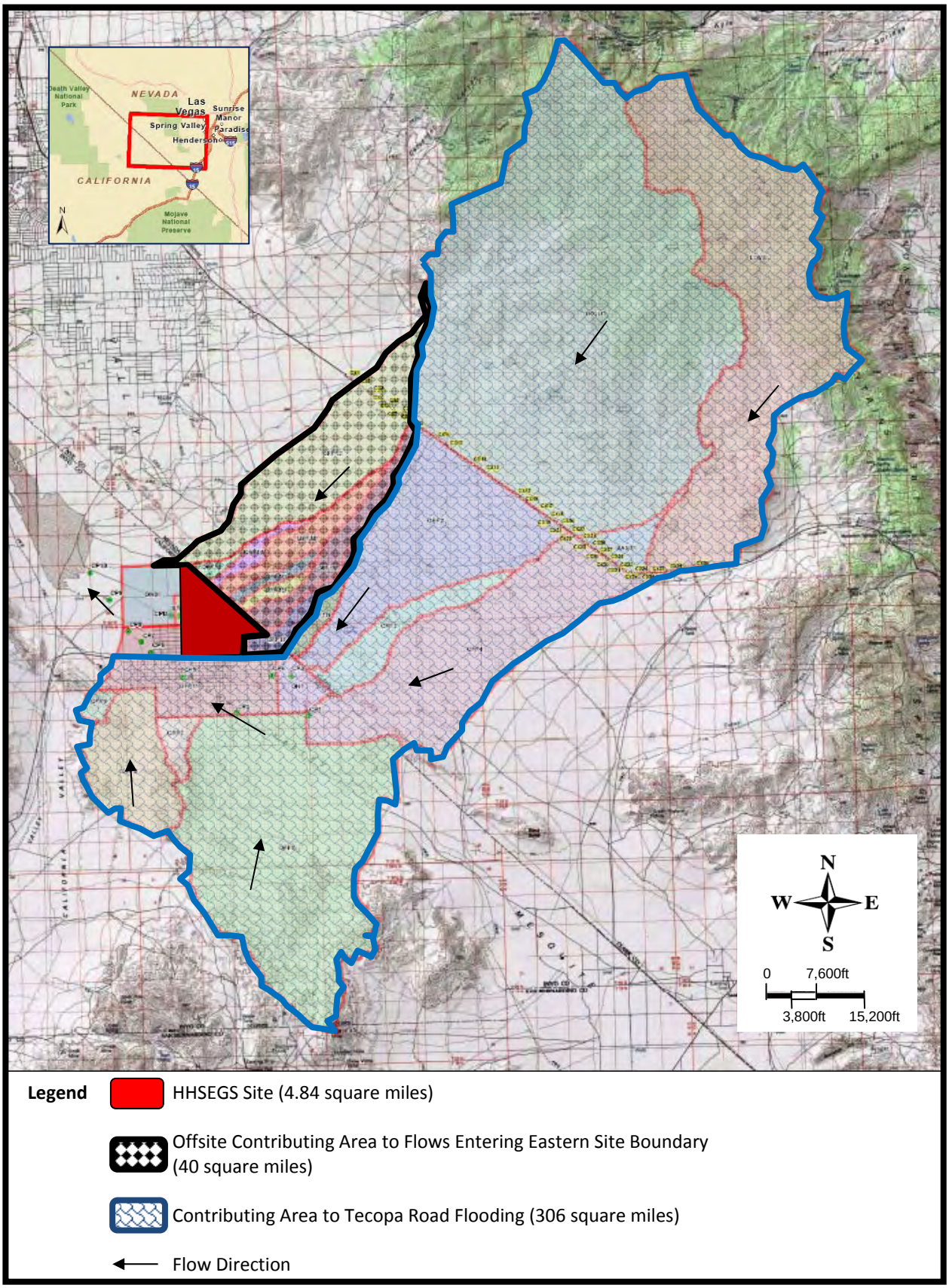
SOURCE: 3/28/2011, VTN Consulting and BrightSource Energy

SOILS & SURFACE WATER - FIGURE 4

Hidden Hills Solar Electric Generating System (HHSEGS) -
Watershed Areas Contributing to Runoff



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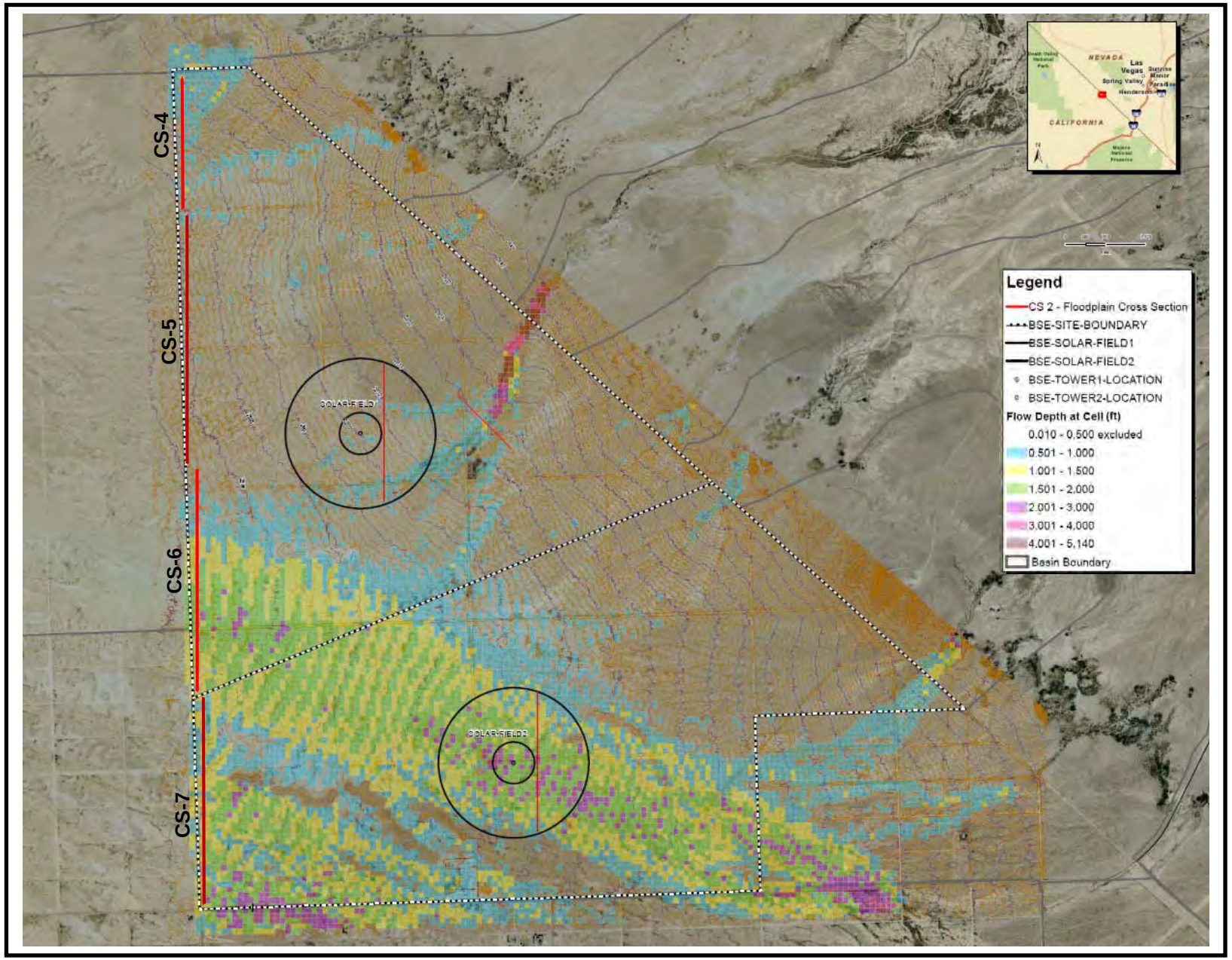
SOURCE: 5/16/2011, VTN Consulting and BrightSource Energy

SOILS & SURFACE WATER - FIGURE 5

Hidden Hills Solar Electric Generating System (HHSEGS) – Preconstruction Depth Map (24 hour – 100 year Rain Event)



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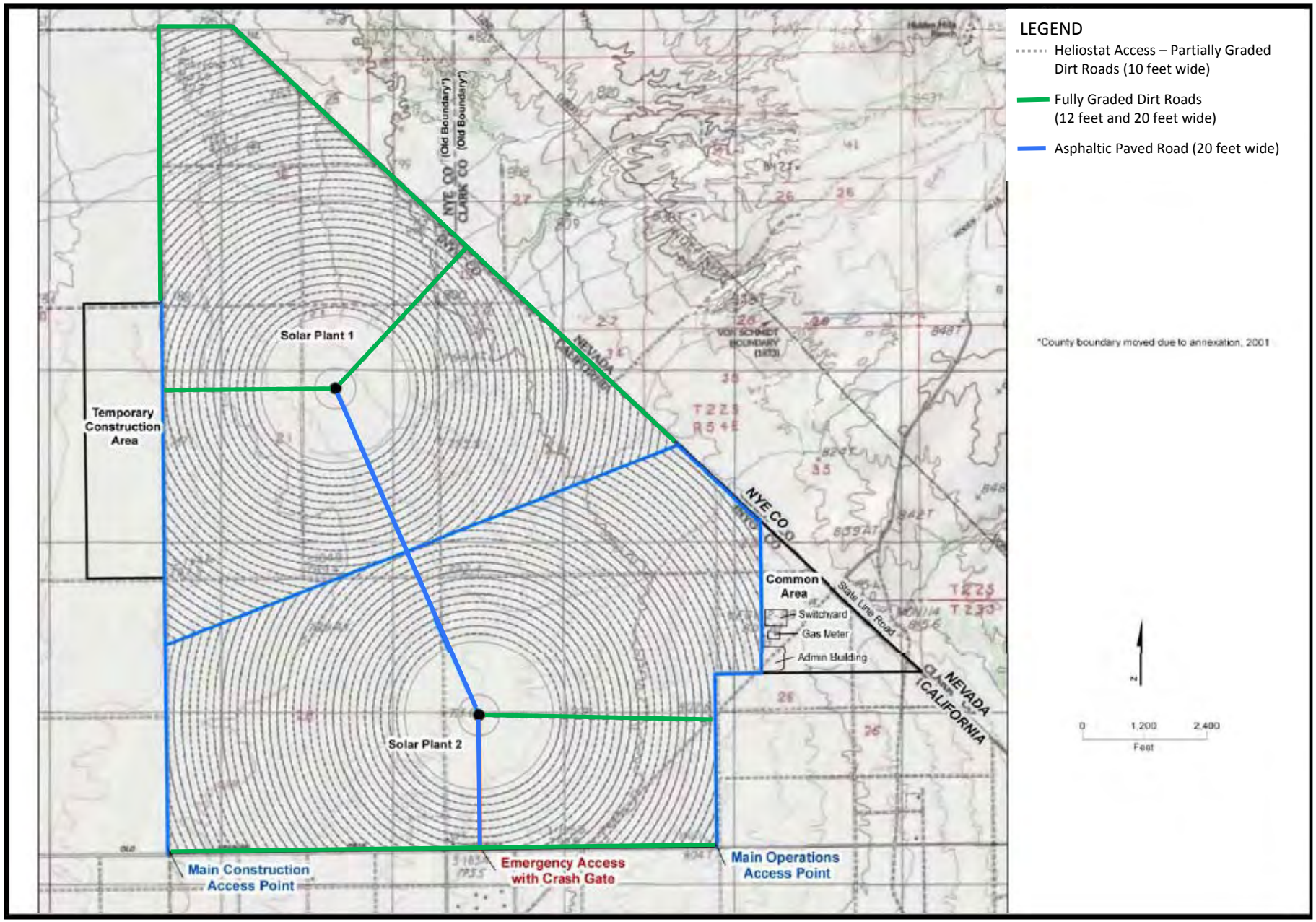
SOURCE: 4/4/2011, VTN Consulting and BrightSource Energy

SOILS & SURFACE WATER - FIGURE 6

Hidden Hills Solar Electric Generating System (HHSEGS) – Road Types



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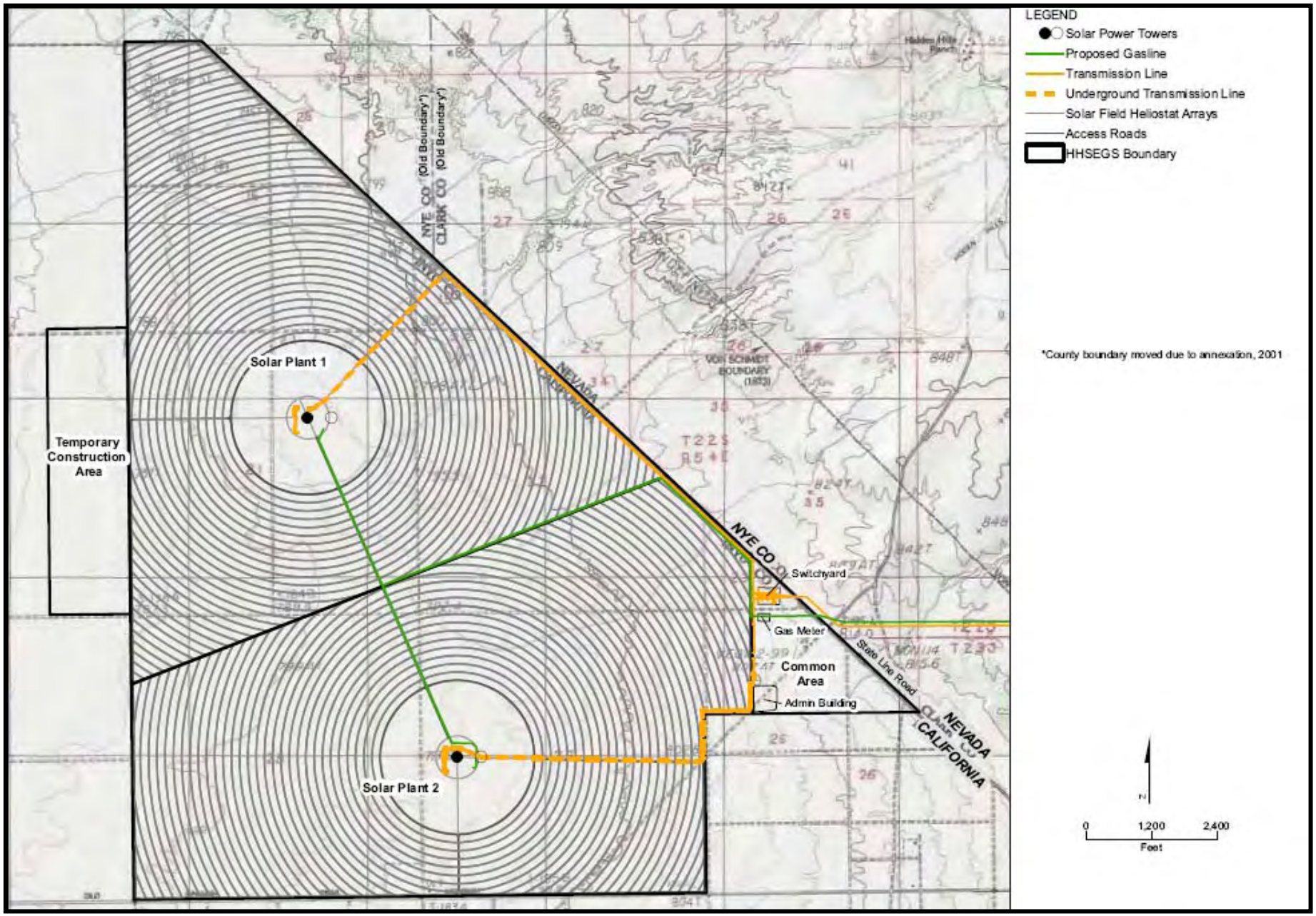
SOURCE: 4/22/2011, Dwg No. C-1000, CH2MHill and BrightSource Energy

SOILS & SURFACE WATER - FIGURE 7

Hidden Hills Solar Electric Generating System (HHSEGS) – Linear Facilities



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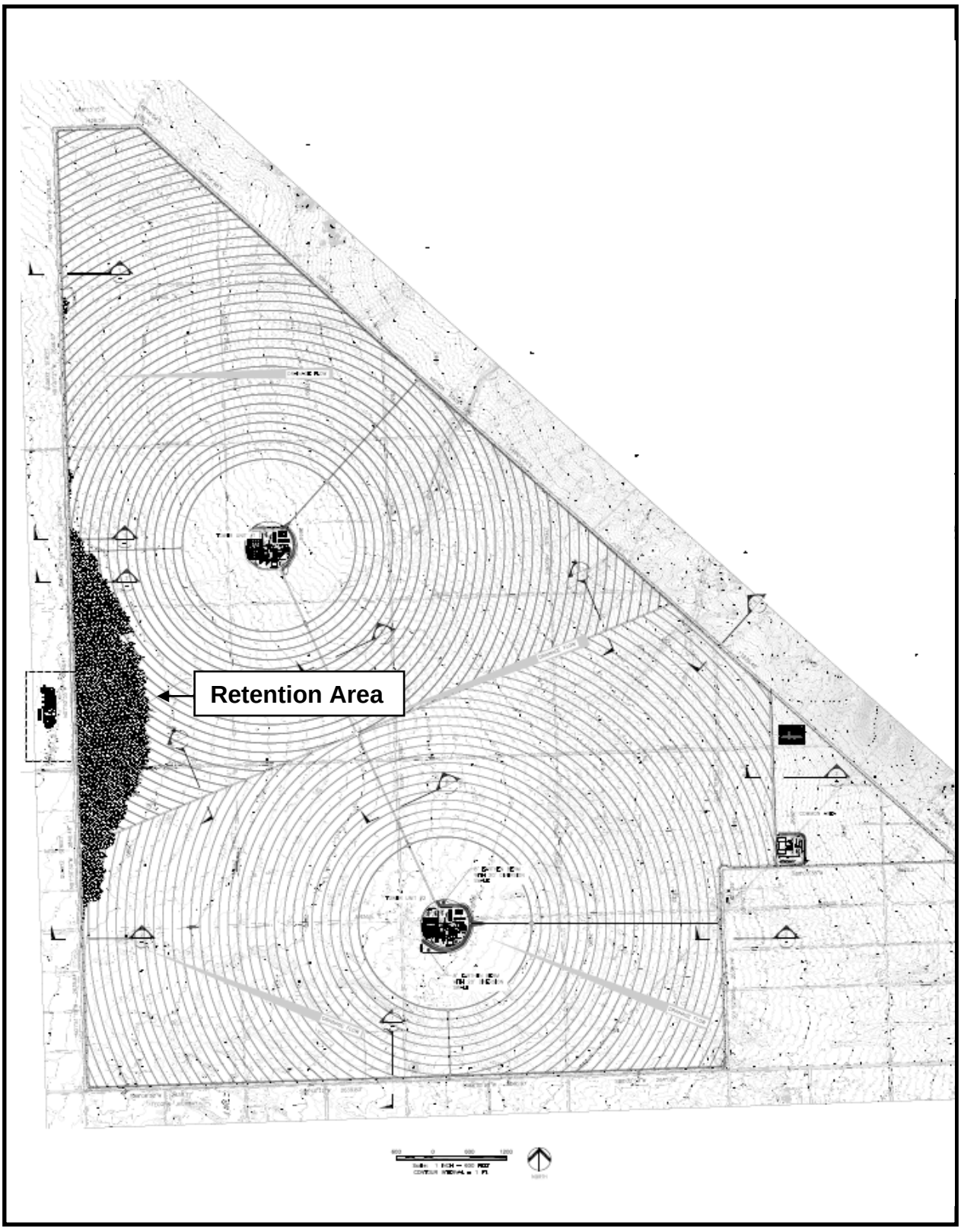
SOURCE: Figure 2.1-2R1, CH2MHill

SOILS & SURFACE WATER - FIGURE 8

Hidden Hills Solar Electric Generating System (HHSEGS) – Retention Area



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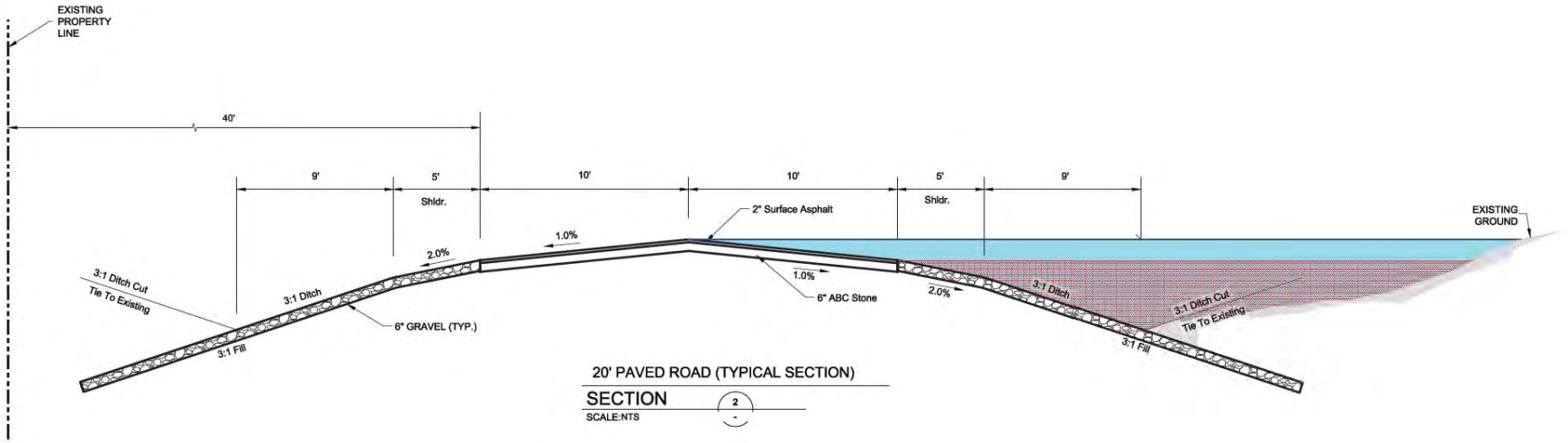
SOURCE: 4/22/2011, Dwg No. C-2000, BrightSource Energy and CH2MHill

SOILS & SURFACE WATER - FIGURE 9

Hidden Hills Solar Electric Generating System (HHSEGS) – Retention Area Cross-Section



LEGEND

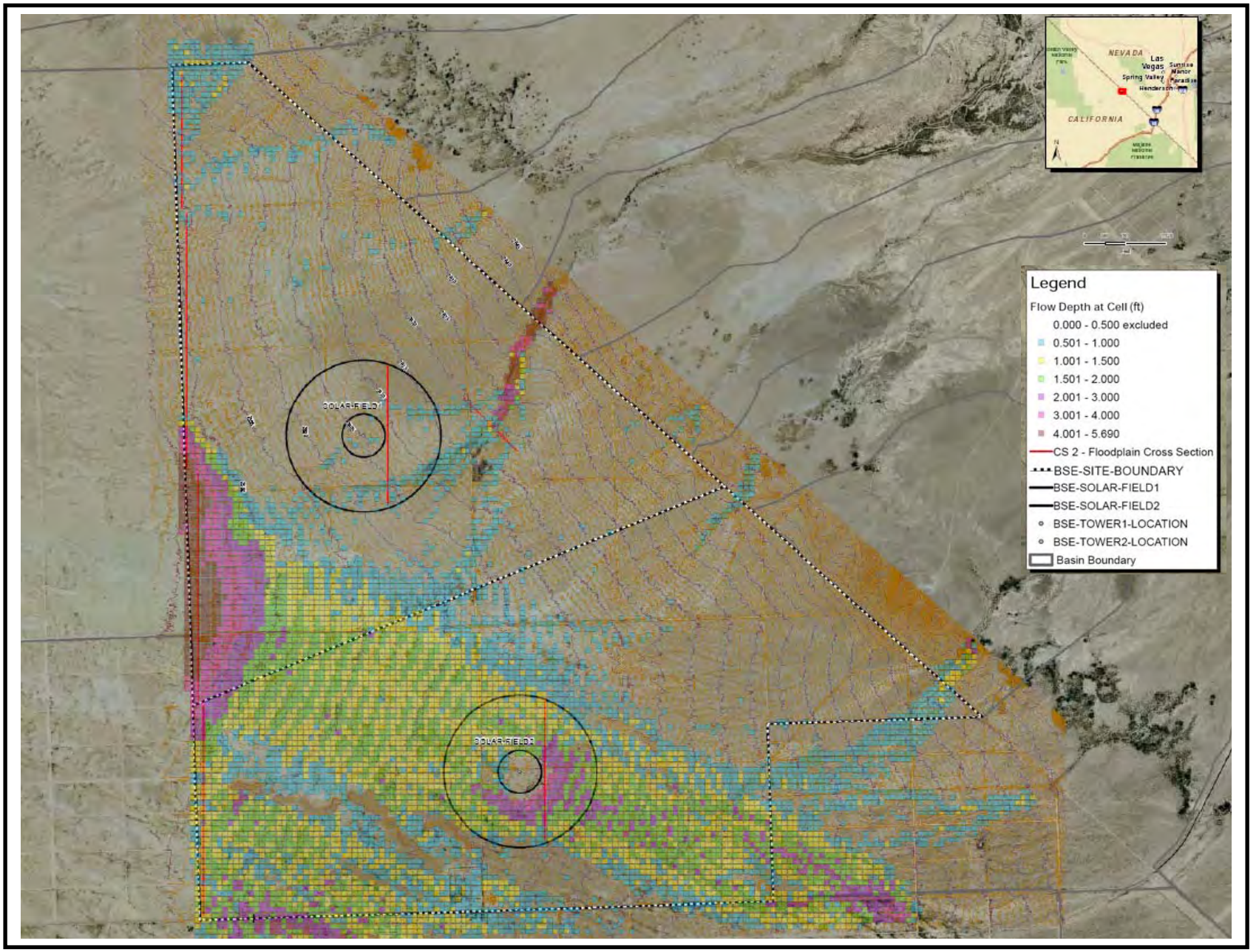
5, 10, 25, & 100-YEAR STORM EVENT INITIAL PONDING (3.80 FEET MAX DEPTH)

2-YEAR STORM EVENT INITIAL PONDING (2.79 FEET MAX DEPTH)

SOURCE: 5/11/2012, VTN Consulting and BrightSource Energy

SOILS & SURFACE WATER - FIGURE 10

Hidden Hills Solar Electric Generating System (HHSEGS) – Post-construction Depth Map (100 year – 24 hour Rain Event)



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SOURCE: 5/25/2011, VTN Consulting and BrightSource Energy

SOILS & SURFACE WATER - FIGURE 11

Hidden Hills Solar Electric Generating System (HHSEGS) -
Example of Tortoise Fence Blocked with Debris

Above: Matted Vegetation.
This is an example of the vegetation mat that formed on the tortoise fencing. The fencing was installed parallel to the ground slope.

Right: Bowed Tortoise Fence.
The trapped sediment and debris caused the tortoise fence to bow out. The stream channel slopes down towards the right.

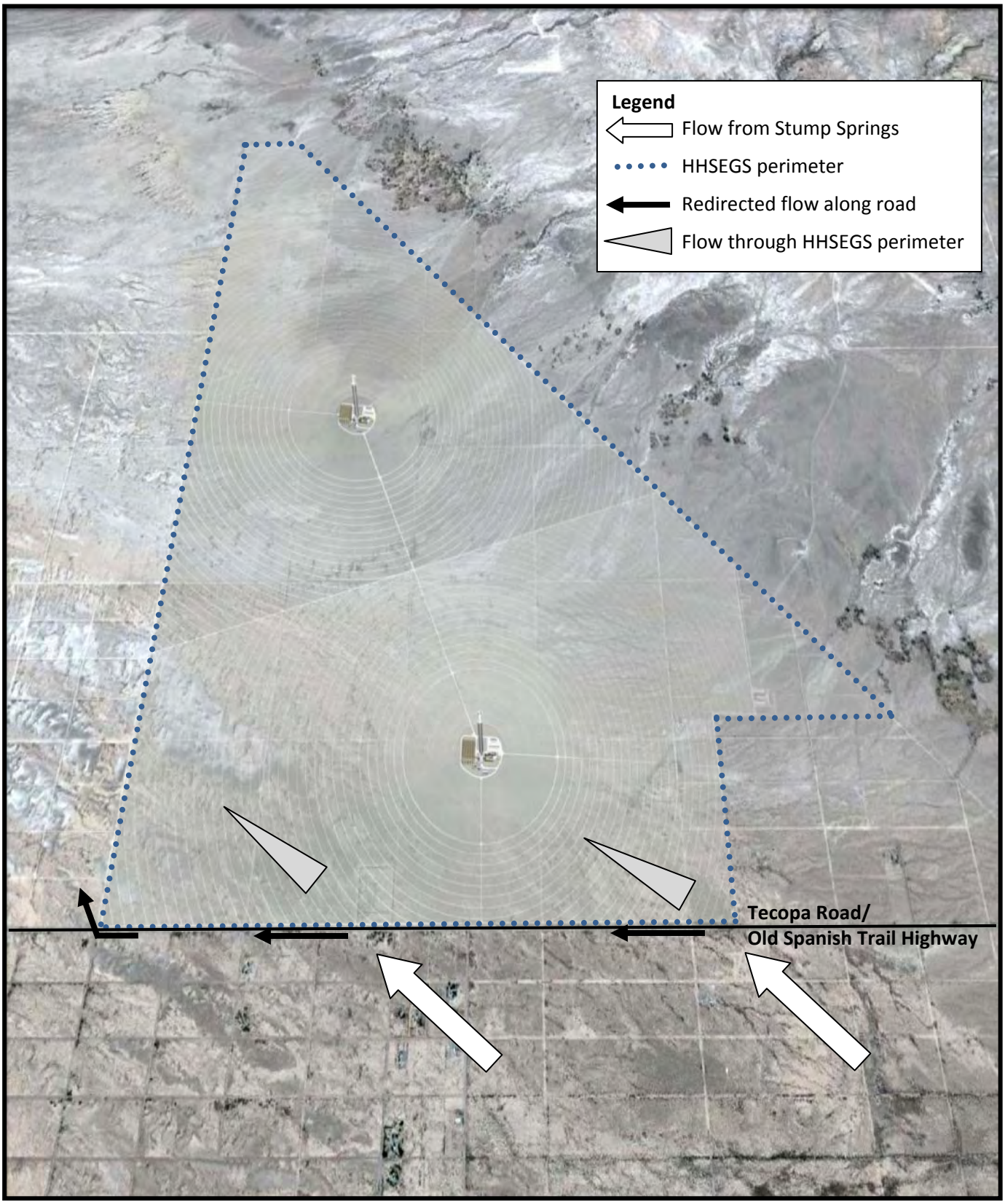
Ivanpah SEGS Construction Site

SOURCE: August 2011, California Energy Commission

SOILS & SURFACE WATER - FIGURE 12

Hidden Hills Solar Electric Generating System (HHSEGS) –

Post-Construction Storm Water Flow Patterns at Tecopa Road/Old Spanish Trail Highway



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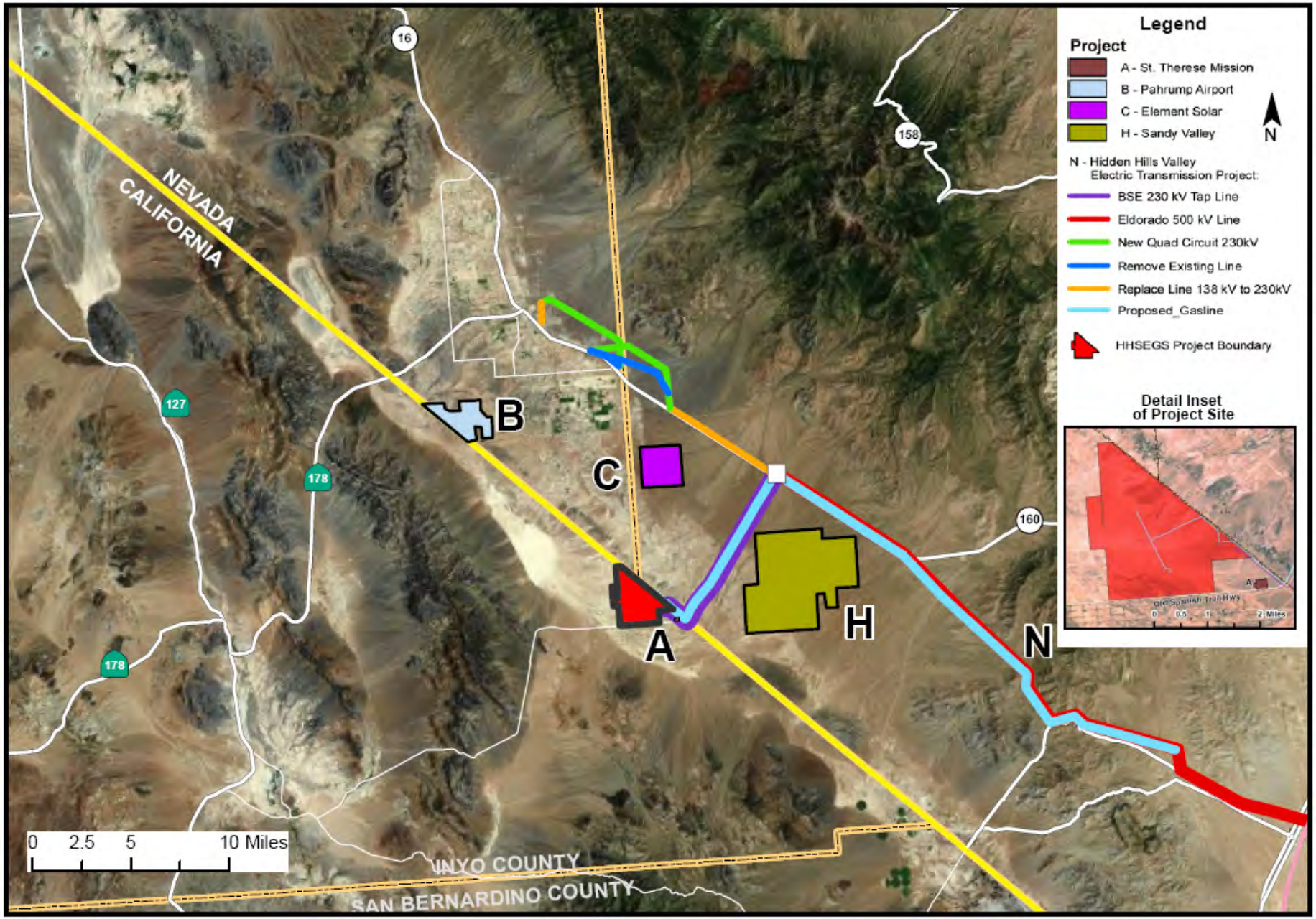
SOURCE: August 2011, BrightSource Energy and CH2MHill

SOILS & SURFACE WATER - FIGURE 13

Hidden Hills Solar Electric Generating System (HHSEGS) – Cumulative Impacts Map



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SOURCE: BLM Southern Nevada District – Renewable Energy in Southern Nevada, BLM California – Renewable Energy Priority Projects